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ABSTRACT

This document is the fifth of seven units developed by the Math Network Curriculum Project. Each unit, designed to be a 2-week module, is a teacher's guide which includes detailed directions along with the courseware and software needed. Teacher intervention in the non-computer activities that begin each unit is required, and the consistent use of small-group instruction makes the units usable in a standard classroom if two microcomputers are present. The Data Analysis Unit concentrates on drawing inferences from data, and students learn to graph data and to read graphs. They begin by collecting and analyzing data about themselves and their classmates. Then they use a computer program to analyze the same data. In a program called Cosmic Explorer, students draw conclusions about a population on a mythical planet. Printed copies of the code for Cosmic Explorer and for two other programs are included. Students use the Data Search computer program to learn to graph and analyze data. The Data Maker computer program enables students to create and edit files of data and store them on tape or go on to the Network project. Finally, the class uses the Network to analyze data about students from several other classes. The programs were developed for use on a Commodore PET Computer with at least 16K of RAM using 4.0 BASIC. (NMS)

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Data Analysis

Teacher's Guide

Math Network Curriculum Project

San Francisco State University

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DATA ANALYSIS UNIT

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(Folds to make an 8-page booklet and cover)

Data Maker Manual (6 pages)

OVERVIEW

The search for meaningful information from data is a basic element of Science and Commerce. It is appropriate that Education include this idea in as many ways as possible to provide students not only with the skills and experience that are needed to carry out this type of activity, but also with a sense of exploration and discovery that is supported by the students' curiosity and intuition.

This unit provides students with experiences for which there are no known "answers", but which can lead to discoveries about themselves, about a ficticious population on a distant planet, and about groups of students in other classes. The computer provides a tool for the graphic representation of large amounts of information; students learn to use this tool to look deeper and deeper into the information they have to work with.

Since the information for this unit comes from the students themselves, the results or conclusions that will be arrived at cannot be predetermined.

As your class works through this unit, students may discover curious and interesting relationships about themselves. There is also the possibility that the directions they take may lead to more mundane and generally accepted results. This verification of what is already believed to be true is part of the scientific method and may need to be supported as such by the teacher. Many important scientific discoveries have been made as a result of investigating the usual rather than the unusual.

HOW TO USE THIS GUIDE

Once familiar with activities in this unit, you need only refer to the Summary of Activities and Materials. To review a particular activity, a more complete description, including teaching suggestions, follows the summary of activities. We hope teachers will feel free to modify our suggestions and to use their own ideas.

We intend that most teachers using this unit will have taken a course introducing them to the units. If you have not taken such a course, you will need to read through and actually do each activity, preferably with some friends. You will need to discuss the activity's purpose and possible pitfalls as you work.

The activities in the unit are of two kinds: Total Class and Independent Computer Work. During Total Class activities, the students will work on the unit either in groups, individually, or in a whole class format. Although some of these activities may require the whole class period (approximately 50 minutes), others will require less time.

During the Independent Computer Work, small groups of students will work at each computer while the other students will work on classroom assignments from outside this unit. These computer activities are starred (*) so you will know that during these days your regular program will be integrated along with the activity from this unit. Generally, groups of three or four students will be working together at a computer. These groups will rotate during a period of several days so that all students will have the opportunity to complete the activity. Using two computers, at least four groups per class period should be able to work at the computer.

In describing the time required for an activity, we will provide the approximate number of minutes required for Total Class activities and the approximate number of days required to rotate a class of 30 students through Independent Computer Work (assuming your classroom has 2 PET computers). The first six days of this unit require very little class time. The last six to eight days are Independent Computer Time. There are three days of whole class instruction between these two time blocks. As a result, this unit can be easily integrated into the regular math program, but a caution is necessary. Students' work on the computer should be reviewed occasionally with the whole class to encourage the sharing of ideas and results. As an optional activity, students could be given a second round on the computer to pursue further either of the last two activities.

The activities in this unit are designed to be used in the sequence given.

Summary of Activities and Materials

1. BAR GRAPHS (20 min. one day, 5 min. two additional days)
An activity to give experience with bar graphs for different subgroups of the class.

LARGE GRAPH PAPER
GLUE STICKS OR PASTE
CONSTRUCTION PAPER (5 colors)
MARKING PENS
QUESTIONNAIRE

2. CROSS TABULATION (20 min. one day, 5 min. two additional days)
An activity to give experience with CROSSTABS for different subgroups of the class.

LARGE GRAPH PAPER
GLUE STICKS OR PASTE
CONSTRUCTION PAPER SQUARES
MARKING PENS

3. STUDENT GRAPHS (1 or 2 class periods)
Students construct their own graphs for the class to respond to.

GRAPH PAPER for small groups
MARKERS OR CRAYONS for small groups

*4. COMPUTER ANALYSIS (1 day whole class, 2 days Independent Computer Time)
This activity teaches students two ways of working with larger amounts of data. It uses a printout of the Student Questionnaire data and the DATA SEARCH program as tools for analyzing the data.

PRINTOUT OF QUESTIONNAIRE DATA
QUESTIONNAIRE
PRINTOUT WORKSHEET
DATA SEARCH WORKSHEET
CLASS INFORMATION WORKSHEET
PET computers
DATA SEARCH program
DATA MAKER program
QUESTIONNAIRE DATA tape from DATA MAKER

*5. COSMIC EXPLORER (1/2 day and 2 1/2 days of Independent Computer Time)

This is a simulation of a discovery voyage to a new planet. Students take on the role of SCIENCE OFFICER to try to discover information about a ficticious population.

COSMIC EXPLORER program
PET computers
SCIENCE OFFICER'S MANUAL
SCIENCE OFFICER'S LOG SHEET
COSMIC DATA printout

*6. NETWORK EXPLORATIONS (3 days of Independent Computer Time) This activity encourages students to check out previous assumptions or findings about their own class, or data from other classrooms.

DATA SEARCH program
PET computer
NETWORK EXPLORATION worksheet
DATA MAKER program (optional)

BAR GRAPHS

Format
whole class

Time
20 minutes, and 5 minutes for two days

Materials Needed
Large graph paper
Glue Sticks or paste
Construction Paper
in five colors
Marking Pens
Questionnaire

Background

Some ideas are so familiar that it is difficult to see the problems students might have in understanding them. This activity, which some teachers use as a regular part of their classroom all year long, is intended to provide students with experience in constructing and interpreting bar graphs. After the introductory activity, it requires only a few minutes of discussion each time. It provides experience with the comparison of two groups from the same population and with the idea of restricting or limiting the data. The questionnaire is for a later activity.

Purpose

- To construct bar graphs that compare different subgroups of students.
- To provide students with practice in extracting information and making conclusions from bar graphs.

Teacher Preparation

Prepare two graphs on large graph paper (approximately 20 x 20 inches) similar to the diagram below. Either one inch or two inch graph paper will work well.

Cut construction paper squares from five different colors. The squares should be just slightly smaller than the graph paper squares. One 8 1/2 x 11 sheet of each color should provide sufficient squares for the entire unit.

Run off a copy of the questionnaire for each student.

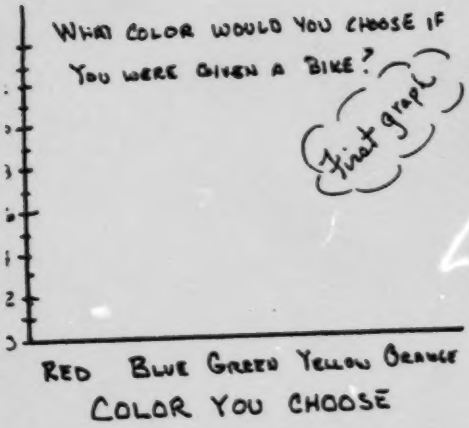
Before each succeeding class, prepare an additional graph either from the suggested list at the end of the Activity section or an idea of your own. The graphs should have a title and be clearly labeled so there is no ambiguity as to where the student should put their square. At least one graph you select should utilize grouped data. An example might be

useful for "Minutes Spent Watching Cartoons Per Week." In this case you could group the responses into five categories: 0-30, 31-60, 61-90, 91-120, more.

You will need to save these graphs for future use and/or display.

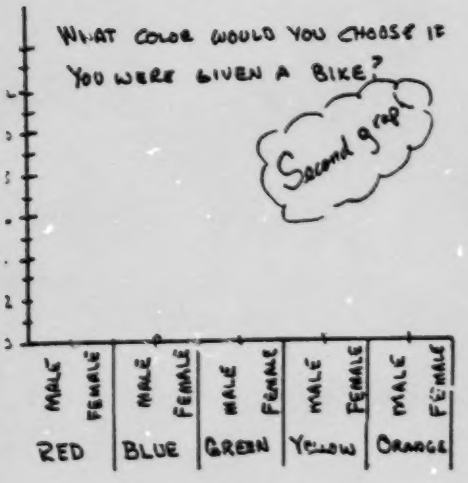
Activity

Write a list on the board of the five colors for which you have construction paper squares. Ask the students to consider which color (from the list written on the chalkboard) they would choose if they were to be given a bike (or car) as a prize. Pass around an envelope that contains those colors listed and have students secretly take two squares of the one color they choose. After each student has taken their squares, ask them to make some predictions about the choices. Some predictions might include such statements as: the most popular color will be blue; the most exclusive color is yellow; no one will pick orange. Try to get informal committment to the predictions by having a show of hands on them.



Post the first graph and have students come to the board by group and quickly glue up one of their squares in the appropriate place.

Briefly discuss the outcomes from the data. Ask students to comment further about the outcomes they see. Examples might include: red is most, more green than blue, etc. Write one or two of these on the graph and label it "SUMMARY STATEMENT".



Ask students to predict what might be the same or different if the graph was just girls or just boys. Write these predictions on the chalkboard.

Post the second graph. Have the boys put up their squares; have the girls put up theirs.

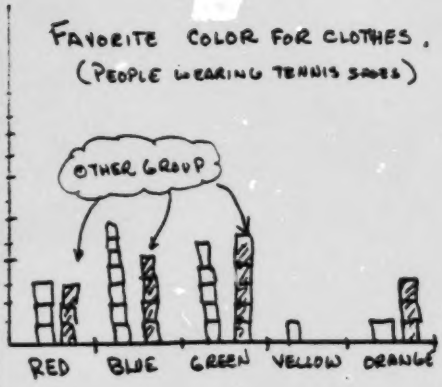
Discuss the results, comparing boys and girls. Compare the predictions with the results; draw out student comments on similarities and differences. Write a SUMMARY STATEMENT for the second graph.

Suggest a different grouping--age, hair color, or people wearing tennis shoes. Would that make the graph different?

Tell the class that they will be making different bar graphs about themselves for the next few days. Tell them where the graph will be posted and that they should quickly put themselves on the graph before the lesson starts.

Questionnaire: Have students carefully complete the questionnaire. You may choose to make it a homework assignment or give them time to think about some of the responses. You will need to use the DATAMAKER program to load the data on a tape and on the Network. The DATAMAKER manual gives directions on how to do this.

NOTE: Read the "Limitations of DATA MAKER" section in the DATA MAKER manual before making the data tape.



On the next two days, post two different graphs for the students. Limiting variables (a condition that restricts who can put themselves on the graph) are to be used, and the follow-up discussion should include the idea, "Would the graph be the same or different for the remainder of the class (the other group)? If student interest is present, you may want to construct the "other group" graph by using different colored-squares on the existing graph. (See diagram.) Be sure to conclude each graph with a SUMMARY STATEMENT.

Possible limiting variables: boys who got an "A" or a "B" on test; wearing tennis shoes; walked to school; ate cereal for breakfast; oldest or only child; have sisters only; live with one parent; weekly allowance more than $1.00. Some of these will exclude some children, so the construction of the "other group" may be important to them.

More bar graph suggestions: Some of the suggestions below lead to a follow-up activity and discussion (#2, #6, #8); others involve the important idea of grouped data (#1, #6). Consider carefully the possible responses to the question when you prepare the graph so the proper categories will be on the graph. Feel free to create your own or have students suggest and/or set up the graphs.

1. What is your usual school night bedtime?

2. At what age do you think you will be "grown up"?

3. How many glasses of milk do you drink per day?

4. Is your last name shorter, longer, or the same as your first name?

5. On what day of the week were you born? (use the perpetual calendar often found in the telephone book.)

6. How much do you think this costs? (Provide an object: can of peas, bag of apples, etc.)

7. What color are your eyes?

8. How many sections do you think there are in an orange?

9. Which hamburgers do you like best? (McDonald's, Jack-In-The-Box, etc.)

10. How did you get to school today?

11. How many centimeters long is your foot? (Students will need to measure.)

CROSS TABULATION

Format
whole class

Time
20 minutes, and 5 minutes for two days

Materials Needed
Large graph paper
Glue Sticks or paste
Construction Paper in five colors
Marking Pens

Background

Cross tabulation (CROSSTABS) provide the opportunity to compare two variables at the same time. Some pairs of variables are known to be related (height vs. age); others may be expected to be totally unrelated but may show a relationship for a given class. The search for possible relationships and non-relationships is the important idea of CROSSTABS.

Purpose

-To construct cross tabulations (CROSSTABS) that compare two variables for a given group or subgroup of students.

-To provide students with experience in looking for relationships and making conclusions from CROSSTABS.

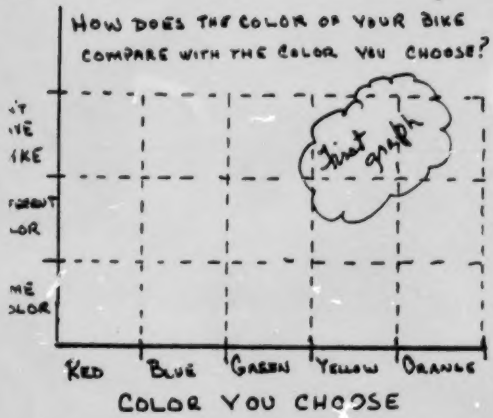
Teacher Preparation

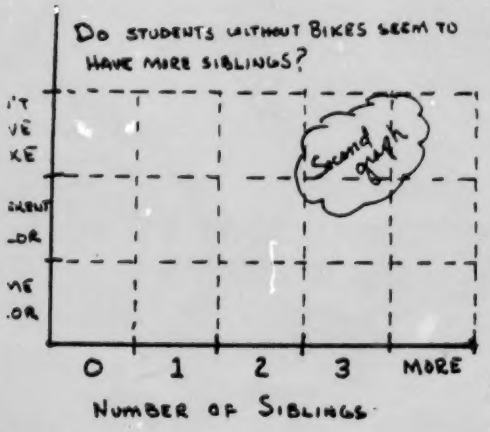
Prepare two graphs on a large (about 20 x 30 inches) graph paper similar to the diagram. Either one-inch or two-centimeter graph paper will work well.

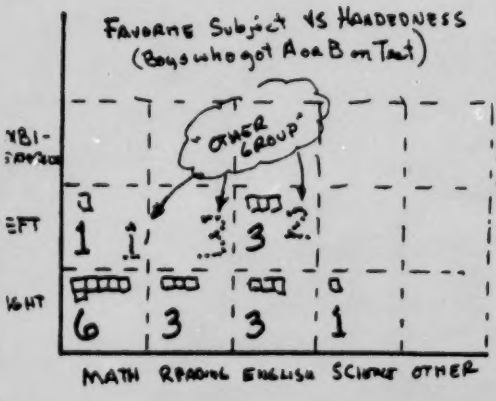
Have ready the remaining cut squares from the previous activity, or cut more if needed.

Before each succeeding class, prepare an additional graph either from the suggested list at the end of the ACTIVITY section or one of your own. Each graph should have a title (or question); where to record needs to be clear. Numerical variables, particularly those that are grouped for convenience, should be included at least once.

You will need to save these graphs for future use and/or display.







Activity

Ask the class: How does the color of the bike (car) you (parents) really have compare with the one you would choose?

Give students the same color square that they chose in the earlier activity. (You could re-do the selection if that's more convenient).

Ask the class to consider the following: Do you think most people choose the color bike (car) that they already have? Have them make a prediction.

Post the first graph and have the students quickly glue up their squares in the appropriate place. Have the "Don't have a bike" group come up first, followed by the "Different color" group, and last the "Same color" group.

With the marking pen, write the number of squares in each space on the graph so that all can see. (See diagram.)

Discuss the outcomes, similarities, and differences among the colors. Ask students to comment about the outcomes they see. Write a SUMMARY STATEMENT or two on the graphs.

At this point, you should ask the class if they think that people who don't have bikes (cars) might have larger families. Define 'siblings' for the class and ask the students for their opinion. Tally results quickly. Write down the class prediction.

Post the second graph. Have the three groups (same, different, and don't have one) take turns pasting up their square in the appropriate place. Write the totals in the appropriate squares.

Discuss the prediction. Write a Summary Statement on the graph.

On each succeeding day, post two different graphs for students. Limiting variables are to be used with some of these, and the follow-up discussion should include the idea, "Would the graph be the same or different for the other group?". If student interest is present, you may want to construct the other group by polling the class and writing the totals in the appropriate squares with a different-colored marker. (See diagram.) Be sure to conclude each graph with a Summary Statement.

Possible limiting variables: boys who got an "A" or a "B" on test; wearing tennis shoes; walked to school; ate cereal for breakfast; oldest or only child; have sisters only; live with one parent; weekly allowance more than $1.00. Some of these will exclude some children, so the construction of the "other group" may be important to them.

More Crosstab suggestions: feel free to create your own pairings or even take suggestions from students. Some may require some prior set-up (Numbers 1, 7, and 8); others may need to be mentioned earlier to give students time to consider their response (numbers 5, 7, and 8).

1. Vowels in your name vs. consonants in your name
2. Siblings vs. Allowance (less than $1.00, $1.00 to $2.00, more than $2.00)
3. Color eyes vs. Color hair
4. Number of pets vs. Number of siblings
5. Number of movies per month vs. Number of hours of TV per day
6. Birthday (day of week) vs. Season of year
7. Height (in cm) vs. Favorite breakfast beverage
8. Favorite sport vs. Height (in cm)
9. Handedness (right or left) vs. Favorite sport
10. Method to school (walk, bus, etc.) vs. Siblings

STUDENT GRAPHS

Format
whole class and small groups

Time
1 or 2 class periods

Materials Needed
Graph paper
for small groups
Markers or crayons
for small groups

Background

Students have by now worked on and discussed several bar graphs and crosstabs. This activity will provide you with the opportunity to check on their ability to construct their own graphs. Some students may be faced with problems such as poorly phrased or ambiguous questions, categories that are too broad or too narrow, and other structural problems which may, in turn, result in too little or too much data. Many of these problems do not come to light until students have had to apply the ideas that they have been using.

Purpose

- To give students the opportunity to structure their own graphs on topics of their own choosing.

- To reinforce graphing ideas developed in earlier activities.

Teacher Preparation

Have the graphs from the earlier activities available for purposes of discussion. Review these briefly and select examples that showed strong conclusions as well as some that were inconclusive.

Decide if you want students to construct large graphs or smaller page-size graphs. Have graph paper and markers or crayons available.

Activity

By way of review, discuss with the class some of the results of the graphs constructed in the earlier activities. Questions such as "What was the limiting variable?"; "Which was most interesting and why?"; "Which was most surprising and why?"; "Which was your favorite?"; "Which was no surprise at all?" might be

useful in getting students to focus on how these were structured. Here you should stress the fact that the categories were unambiguous, that is, there was only one place for each person to place him/herself.

Tell the class that today they will set up a graph of their own. Brainstorm with the class a list of ten to twenty ideas about which they would like to collect information. Write the list on the board. Explain that partners will pick one thing from the list and make a graph for the class to fill in.

Have students choose an idea from the list with a partner. Do this with the entire class to avoid duplicates as much as possible. Partners should do the following:

1. Make a rough sketch of their graph to "figure it out". Be sure there is a title, a question for others to answer, and clear directions as to how they will respond.

2. Make a prediction about what their graph will show.

3. Make and post the graph for the class. (Note: You may want to post the graphs on the following day if time is short.)

Through examples and a questioning strategy, the teacher should encourage students to think through the questions they write on the graph. All too often, the responses to an unclear or ambiguous question will give unclear or ambiguous data. Students should be given a second opportunity to sharpen and clarify the question they are asking.

When the groups have completed their work, the class as a whole puts themselves on the graphs.

Partners will retrieve their graphs and write a summary statement. They should also report back to the class with two statements:

1. What did the graph show about the question?

2. How do the results compare with the prediction?

The teacher may request these to be written and/or orally given and/or posted.

COMPUTER ANALYSIS

Format
whole class and
groups of four

Time
one day for whole class
two days for group computer work

Materials
Printout for Questionnaire data for each student
Copy of the Questionnaire for each student
Questionnaire data from DATA MAKER
PRINTOUT WORKSHEET
DATA SEARCH WORKSHEET
CLASS INFORMATION WORKSHEET
PET computers
DATA SEARCH program
DATA MAKER program

Background

So far, students have been asked to work with specific variables. They were acquiring skills for organizing and representing that data. This activity uses the QUESTIONNAIRE DATA and directs them toward the search for information that they themselves select. Large amounts of data can be overwhelming, so a progression of activities leads the students toward a more independent search.

Some students will need hints and suggestions from the teacher, but most should be encouraged to explore whatever variables are of interest to them. You will need to remind students that even if their results show no difference, or if their predictions are not born out, their report and summary statements are still valuable.

The skills involved in looking for information are used by social workers, lawyers, football coaches, doctors, and other professionals that work with large amounts of data. You should encourage the idea of "see what you can find out about our class."

Purpose

- To teach students to extract information from lists of printed data.
- To teach students to use the DATA SEARCH program.
- To have students explore large amounts of data to find similarities and differences.
- To collect data on CLASS INFORMATION WORKSHEET for a future activity.

Teacher Preparation

Important!: At least three days before you are ready to begin this activity, you must make two tapes of the questionnaire data and store this information

on the MNCP Network. Send a message to the NETWORK managers requesting that a printout of your class' data be made and sent to you. If you have a printer, DATA MAKER will allow you the option of listing your own data to get the necessary printout.

Prepare a copy of the questionnaire and the printout for each student.

The day before, use the DATA SEARCH program yourself to explore the questionnaire data from DATA MAKER. Note the errors you might make, particularly those that may arise in setting up limited, two-group bar graphs. Be sure to explore the listing option.

Prepare copies of the PRINTOUT WORKSHEET, the CLASS INFORMATION WORKSHEET, and the DATA SEARCH WORKSHEET for each student. The CLASS INFORMATION WORKSHEET is run off back-to-back with graph paper.

Load the DATA SEARCH program into each computer. Have the QUESTIONNAIRE DATA tapes available for each computer.

Prepare classwork from outside the unit for the two days of Independent Computer Time.

Activities

Explain to the class that until now the information they have worked from has either been chosen for them and/or has been a very limited choice. From the activities of the next few days, they will be given the chance to look at all of the information that was on the questionnaire they filled out earlier. First; however, there are two tools they will need to learn about and practice with.

The first tool is the printout. Pass out a copy of the questionnaire and a copy of the printout to each student. Explain that each item on the questionnaire is a **variable**, which means that there can be different answers from different people. The **values** of each variable are the possible answers that can be given to that question.

You should at this point conduct a sample exploration with the printout to familiarize students with the format of the data. Pick a variable, such as 'Number of Siblings' or 'How do you usually get to school', and ask a few simple questions of the class. "How many students walk to school?" or "How many

students have more than two siblings?" are examples of simple questions. Follow these questions with more complex questions such as "How many girls come to school in a car?" or "How many people with zero siblings (an only child) get a regular allowance?" In these examples, or in others that you may construct, point out that a second variable comes in to 'limit' the first. In the last question, the 'allowance' variable limits the 'siblings' variable. We call this second variable a **limiting variable.** Ask students to identify the limiting variable where appropriate. It might also be of interest to ask students to describe to the class different methods they used with the printout to answer the more complex questions. Let students suggest several questions of their own for the whole class to try.

The second tool is the DATA SEARCH program. Place the computer where the class can see the screen. You may have a student assist you by doing exactly as you do on the other computer so that half of the class can look at the other screen. Classroom control will be very important at this point because the description you give may get complex. When you make mistakes (and you will!), use it as an opportunity to show how they will be able to correct their own mistakes. Enlist their cooperation and patience. As screenfuls of menus or options appear, read them to the class and have them make suggestions for the choices which will determine the graphs made.

Do several bar graphs. Start with a simple, single-group example; follow with an example that uses a limiting variable; finish with a two-group bar graph. In this last example, you may put limits on both groups or you may just compare the limited group with the total class. This type of comparison occurs when you request a two-group bar graph and one group has no limits set. Ask the class about a summary statement for the last graph made. Be careful that they understand that the limited group had fewer cases to start with. Point out the **number of cases** at the bottom of the left side of the screen. Demonstrate the use of the **listing** option. Note that the list is for the group indicated on the screen.

In a similar way, do several **crosstabs** with the class. As you do, point out that there are two main variables required, and even though you can use limiting variables, there is only one group being studied. Once again, demonstrate the listing option as a way of looking at the data.

Hand out the PRINTOUT WORKSHEET, the CLASS INFORMATION WORKSHEET, and the DATA SEARCH WORKSHEET to each student. Explain that the first three questions of the CLASS INFORMATION WORKSHEET can be done from the printout. Schedule two groups the remainder of this class period and the rest of the groups over the next two days. Time should be devoted at the end ot this activity to have groups report back on their findings. Students will work on regular classwork while the remaining groups cycle through the computer.

Save the worksheets for future reference. Students will need the results of the CLASS INFORMATION worksheet for the final activity of this unit (NETWORK ACTIVITIES).

COSMIC EXPLORER

Format
small groups

Time
20 minutes whole group
and 3 to 5 days
of Independent
Computer Time

Materials Needed
PET computer
Cosmic Explorer program
Science Officer's Manual
Science Officer's Log
Sheet ditto
COSMIC DATA printout

Background

Whatever results have come forth from looking at data from the class, Cosmic Explorer has built into it many unusual things to discover. The attributes of the population include three sexes, curious facts relating to hair and eye color, age considerations and more. The intention of this simulation is to give students the opportunity to play with data-searching skills as they explore data from a planet of small creatures that seem to undergo a variety of changes as they grow older. The idea to be created is that as Science Officers, the students will need to do research to find out and record as much as they can about the inhabitants of the planet from the data available.

Purpose

- To have students "play" with data.
- To have students record results from a series of computer explorations.

Teacher Preparation

Run off copies of the SCIENCE OFFICER'S LOG SHEET back-to-back with the EVIDENCE page. Each student will need at least two.

Have ready a copy of the SCIENCE OFFICER'S MANUAL for each group.

Play the COSMIC EXPLORER program yourself to become familiar with it.

Prepare a folder labeled SCIENCE OFFICER'S LOG BOOK for students to put completed worksheets.

Before class, load COSMIC EXPLORER in both computers.

Activity

Explain to the class that for the next few days, small groups will be working as science officers on a space ship and that they will have the job of discovering at least two things about the inhabitants of a new planet. They will need to share information in their small group and with other small groups. Each time they run COSMIC EXPLORER, they will have to prepare a SCIENCE OFFICER'S LOG SHEET. The back of the sheet is used to report the evidence on their findings. This is going to be like the SUMMARY STATEMENTS they have written in earlier activities and may also include a graph copied from the computer. The SCIENCE OFFICER'S MANUAL gives information and examples on how to record on the SCIENCE OFFICER'S LOG SHEET. Tell them that each group can get information about what others have already found out by studying the SCIENCE OFFICER'S LOG before they start the computer program.

There are several ways for you to use the COSMIC DATA printout with the class: a copy of the entire listing may be left in the SCIENCE OFFICER'S LOG BOOK; you may give a group a single page of data to use at the computer; or you may generate a whole class activity using the printout much as you did in the previous activity.

An important note: Each time the computer looks through the data, it takes 3 to 4 minutes. If they made an error in the setup, or if they have seen enough, typing shift @ will take them back to the main MENU. The time they are waiting for the results is a good time to make predictions about what is happening.

You should note, and point out to the class, that pressing the space bar will stop the graphing process. Press RETURN to continue. Also, if you have a Commodore printer, you can get a printout of a completed graph by typing the letter P.

First Example Try an example with the class. RUN the program. Read what is on each screen out loud. If you have a student duplicate your typing on another machine, then the class can watch either screen.

Try the following bar graph set-up:

MAIN VARIABLE: SEX
LIMIT VARIABLE 1: AGE
(set at from 1 to 10 for group 1 and set at 11 to 20 for group 2)

Ask the class what is being compared. Do a DOUBLE BAR GRAPH. Should you make any errors in the setup, discuss this openly as you correct them.

While the double bar graph builds, comment on what you can see, such as the three sexes, the automatic changing of the scale, when a bar reaches the top, the fact that there are more in group 2 (the older group) than in group 1. Ask what else they see. Comment on the numbers of cases shown at the bottom of the left-hand side of the screen.

Demonstrate how you fill out the SCIENCE OFFICER'S LOG SHEET.

Second Example:

MAIN VARIABLE: AGE
LIMIT VARIABLE 1: SEX

(set DEES for group 1 and set DEM for group 2)

Mention that you could use LIMIT VARIABLE 2 to limit the AGE if you wanted to look at certain ages.

Do a DOUBLE BAR GRAPH to compare the groups. While the bar graph builds, ask students to describe the two groups. Have them make predictions.

Fill out a SCIENCE OFFICER'S LOG SHEET from their conclusions. Be sure to discuss what kind of **evidence** might be included in their report.

Assign groups to Independent Computer Time for the remainder of the period and have others continue with other class work.

Discussion: The SCIENCE OFFICER'S LOG BOOK, the folder you prepared to collect student's work, can now provide the stimulus for discussion. Conclusions students found can be discussed, tried on the computer and embellished as time permits. Press for SUMMARY STATEMENTS from the data. Pull together different groups' work on similar subjects. You could establish a meeting of Science Officers to report their results in tone of mock formality. Students may need their log sheets for this discussion. You could also consider asking for surprises found, interesting or unexplained variations in the data, and investigations that gave no usable results. All these occur in scientific research.

NETWORK EXPLORATIONS

Format
Small groups

Time
3 days of
Independent Computer
Time

Materials Needed
PET computer
DATA SEARCH program
DATA MAKER program
NETWORK EXPLORATIONS
WORKSHEET
PRINTOUT from other
classroom data

Background

A payoff for many students will be looking at the data from other classrooms. They will be able to apply their skills to the task of checking what other students have in common or how they are different from themselves.

Student curiosity in what others are like is the major motivation for the NETWORK activities. Snooping around in data about other students, looking for and reporting on similarities and differences will give the opportunities to use the skills acquired.

Purpose

- To give students the opportunity to use their data-searching skills on data from other classrooms

Teacher Preparation

You should decide for yourself whether students can select data from any other class, or from a class or classes that you select. You may, for instance, want them to work only with classes of the same grade level.

If you don't have your own printer, you should request through the NETWORK a printout of data from other classroom(s) enough in advance to have copies available for students. You should also have made data tape(s) with DATA MAKER for the same class(es). See DATAMAKER MANUAL under the section, "Other Things You Can Do," for directions. Both the tapes and the printouts from other classes can be requested directly from other teachers.

Run off copies of the NETWORK EXPLORATIONS worksheet for each student. The reverse side of the worksheet (or an additional page) should be graph paper for students' graphs.

Activity

Explain to the class that their small groups will be investigating the questionnaire data from other classrooms and they will need their completed copy of the CLASS INFORMATION WORKSHEET to compare against. They should look at the data, from the other class using the printout, DATA SEARCH and a data tape that you give them.

Schedule the small groups for Independent Computer Time for the next three days. The other groups will continue with their regular class work. At the end of the activity, have groups report on their findings to the whole class.

Appendix

QUESTIONNAIRE

Please answer the following questions as carefully as you can. You will be using the information to learn more about this class. Other classes will be doing the same questionnaire so that you will be able to learn more about them as well.

1. SEX. Male_____ Female_____
2. COLOR OF EYES.
   Brown_____ Blue_____ Green or Hazel_____ Other_____
3. COLOR OF HAIR.
   Black_____ Brown_____ Blond_____ Other_____
4. YOUR AGE TODAY._____
5. ARE YOU: Right-handed_____ Left-handed_____ or Ambidexterous?_____
6. YOUR HEIGHT IN CENTIMETERS._____
7. POSITION OF BIRTH.
   Only child_____ Oldest_____ Between_____ Youngest_____
8. NUMBER OF SIBLINGS YOU HAVE.
   Zero_____ One_____ Two_____ Three_____ More_____
9. HOW DO YOU USUALLY TRAVEL TO SCHOOL?
   Walk_____ Bike_____ Car_____ Bus_____ Other_____
10. HOW MUCH MONEY DO YOU GET PER WEEK FOR ALLOWANCE?_____(If none, write zero.)
11. APPROXIMATELY HOW MANY HOURS OF TV DO YOU WATCH IN ONE WEEK?_____
12. APPROXIMATELY HOW MANY HOURS OF RADIO DO YOU LISTEN TO IN ONE WEEK?_____
13. OF THESE SCHOOL SUBJECTS. WHICH IS YOUR MOST FAVORITE? (Pick one.)
    Math_____ English_____ Science_____ Reading_____ History_____
14. OF THESE SCHOOL SUBJECTS WHICH IS YOUR LEAST FAVORITE? (Pick one.)
    Math_____ English_____ Science_____ Reading_____ History_____
15. WHICH ONE OF THESE IS YOUR FAVORITE FAST FOOD?
    Pizza_____ Hamburger_____ Tacos_____ Chicken_____ Hot Dogs_____
16. WHAT IS YOUR FAVORITE SOFT DRINK?
    Coke_____ 7-Up_____ Root Beer_____ Orange_____ Other_____
17. WHAT AGE DO YOU THINK IS "GROWN UP"?_____
18. DO YOU TAKE SOME KIND OF LESSON AFTER SCHOOL?
    None_____ Music_____ Sports_____ Art_____ Other_____
19. PLEASE CHECK YOUR FAVORITE HAMBURGER PLACE.
    Jack-In-The-Box_____ McDonald's_____ Wendy's_____ A & W_____ Other_____
20. WHICH BEST DESCRIBES YOUR SCHOOL NIGHT BED TIME?
    Before 8_____ 8 to 8:30_____ 8:30 to 9_____ 9 to 9:30_____ Later_____

PRINTOUT WORKSHEET

For each of the following, share ideas with your group.

1. Share ideas with the group about the task.
2. Compare ideas and suggestions about doing it.
3. Work together to complete the task.
4. Go on to the next one.

1. **How many MALES get to school by walking?** _____
   How many FEMALES come in a CAR or BUS? _____

2. **What goes best with hamburgers?**
   Construct a **bar graph** for favorite soft drinks. Limit the graph only to people who prick HAMBURGER as their favorite fast food. Write a SUMMARY STATEMENT.

   SUMMARY STATEMENT: _____
   _____

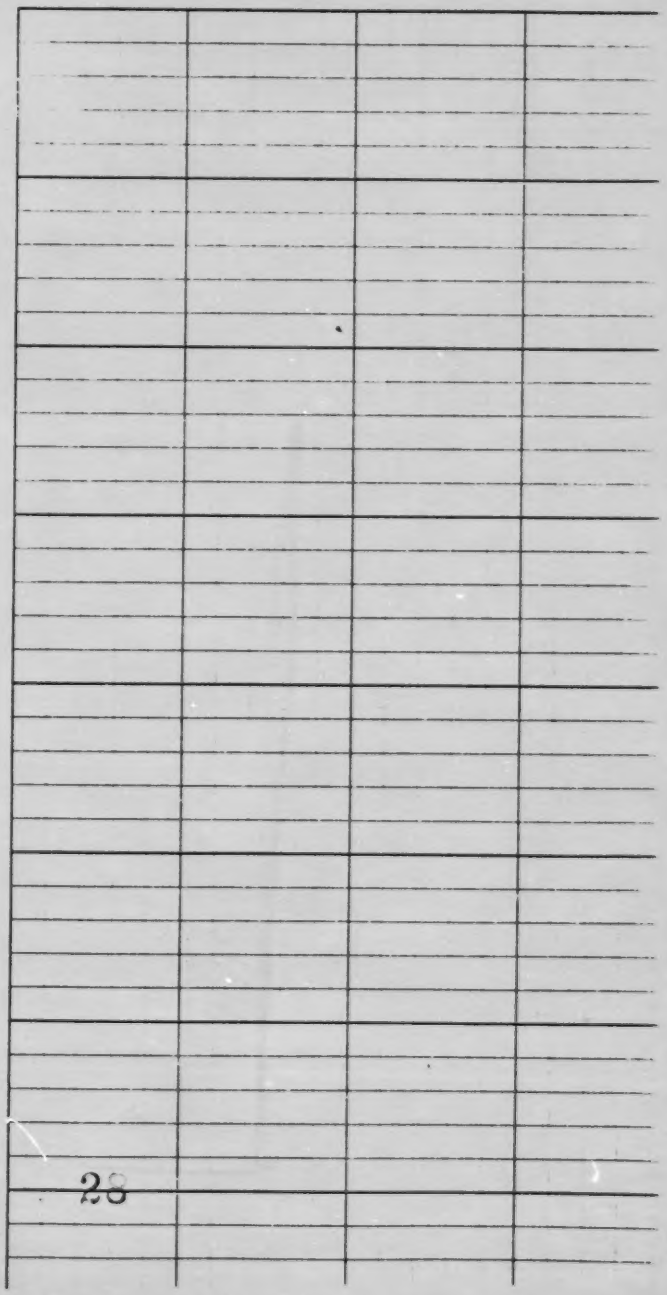
3. **Do right-handed people go to bed earlier than left-handed people?**
   Construct a **crosstab** and answer the question if you can.

   SUMMARY STATEMENT: _____
   _____

4. Construct a **bar graph** for any item of your choice. You may limit the data if that's more interesting. Write a PREDICTION first. Write a SUMMARY STATEMENT, too.

   PREDICTION: _____
   _____

   SUMMARY STATEMENT: _____
   _____



DATA SEARCH WORKSHEET

For each of the following, draw careful graphs.

1. Construct a **bar graph** for eye color. Limit group 1 to MALE and Group 2 to FEMALE. Do a **double group bar graph.** Write a SUMMARY STATEMENT.

   _____

   _____

2. **Does early to bed make you taller?** Make a PREDICTION. Do a **crosstab** to find out.

   PREDICTION: _____

   _____

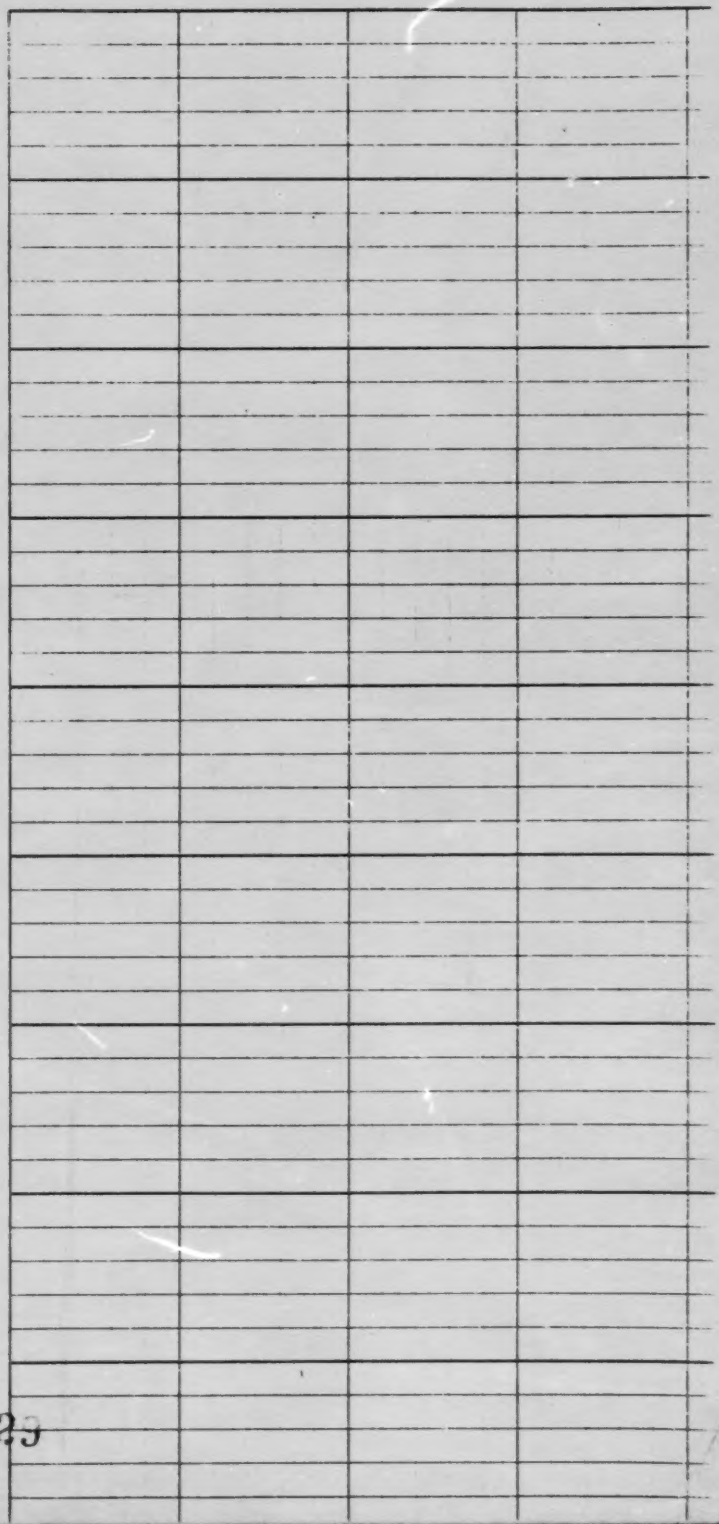
   SUMMARY STATEMENT: _____

   _____

3. **Do people who go to bed later watch more TV?**
   Construct a **crosstab** to try and answer the question.
   Write a SUMMARY STATEMENT.

   _____

   _____



4. **Most liked school subjects.** Construct three different **bar graphs** to find out something about the people who like different subjects. Make a SUMMARY STATEMENT for each.

SUMMARY STATEMENT 1: _____

_____

SUMMARY STATEMENT 2: _____

_____

SUMMARY STATEMENT 3: _____

_____

5. Write a question to answer with a **crosstab.**

QUESTION: _____

_____

_____

Do the **crosstab** and write a summary statement.

Write a SUMMARY STATEMENT.

_____

_____

6. Write a question to answer with a **bar graph.**

QUESTION: _____

_____

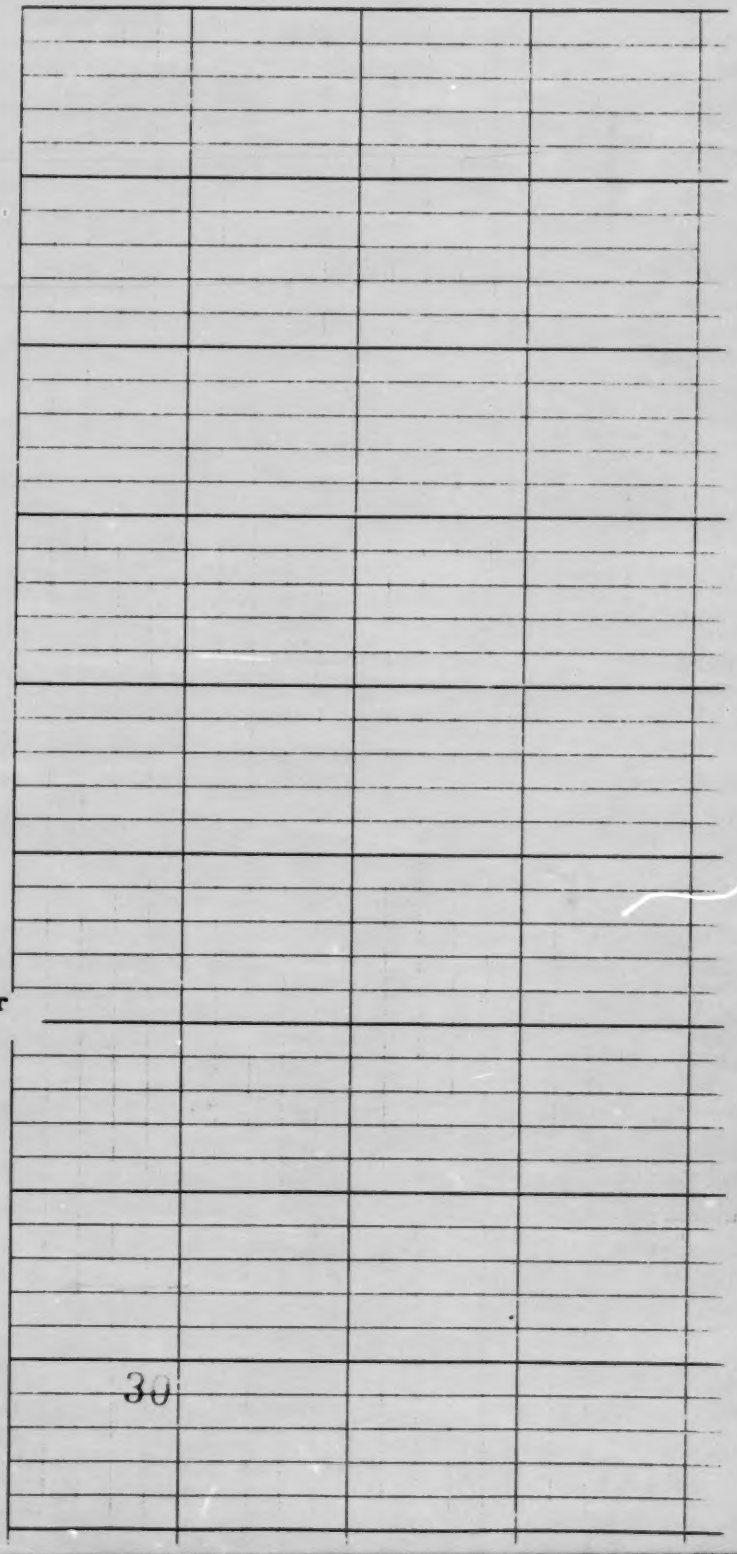
_____

Do the **bar graph** and write a summary statement.

Write a SUMMARY STATEMENT.

_____

_____



CLASS INFORMATION WORKSHEET

The purpose of this worksheet is to collect information that describes your class. This information will be used later when you work with information from another class. For some questions you can use your PRINTOUT to record totals for each category. For others, you will need to record the graph on the back of this page. Label your graphs carefully.

1. Number of Siblings: ZERO____ ONE____ TWO____ THREE____ MORE____

2. Favorite Fast Food: PIZZA___ HAMBURGER___ TACOS___ CHICKEN___ HOTDOG___

3. Least Favorite Subject: MATH___ ENGLISH___ SCIENCE___ READING___ HISTORY___

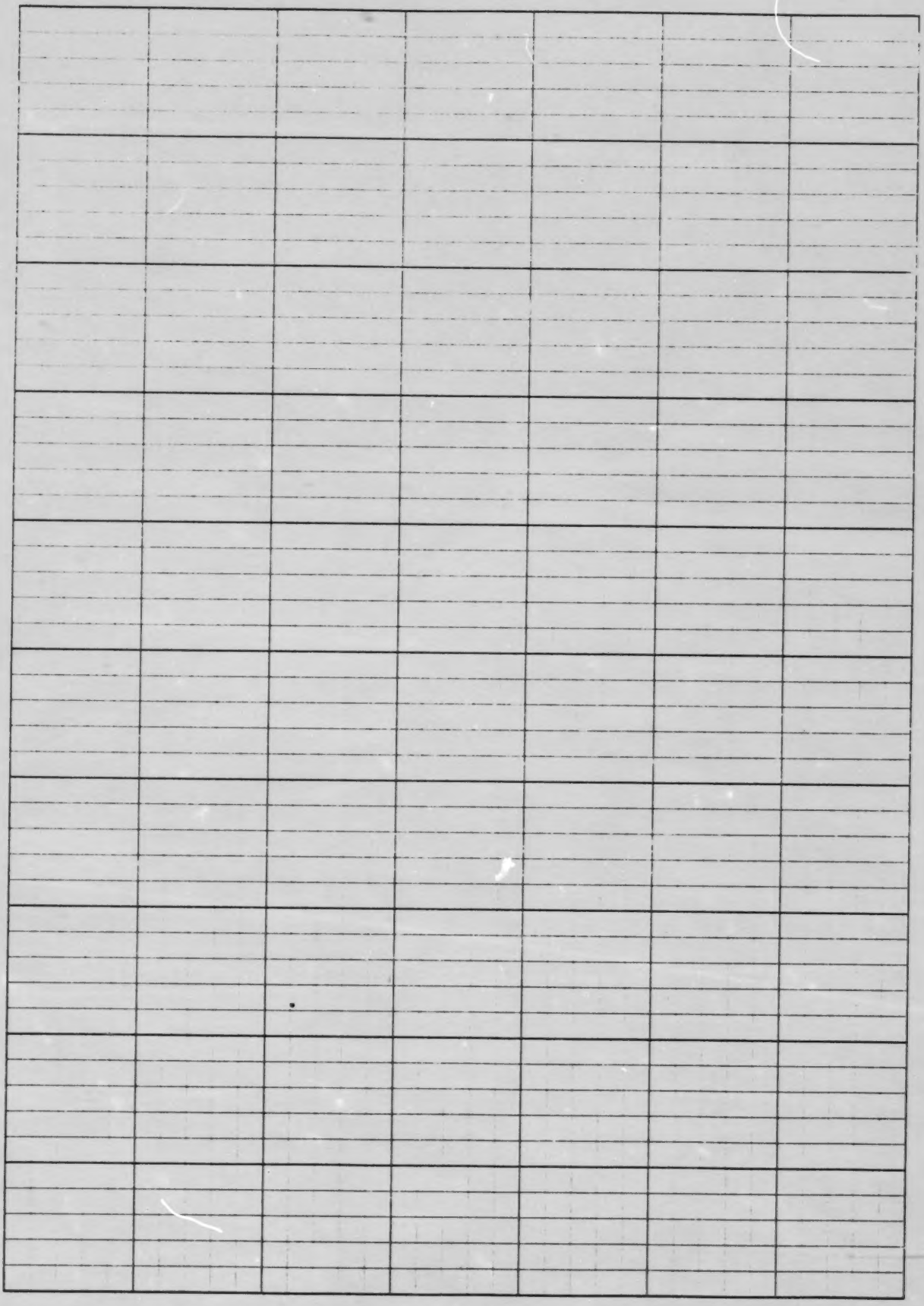
4. Construct a bar graph for hours watching TV in one week.

5. Construct a crosstab for allowance and lessons after school.

6. Construct a bar graph of your choice that has two groups, male and female.

7. Construct a crosstab of your choice that uses siblings as one variable and your choice as the other.

8. Construct any other graphs that interest you if you have time.



GROUP NAMES

_____
_____
_____

SCIENCE OFFICER'S LOG SHEET

I. TYPE OF RESEARCH (CHECK ONE)

- ☐ BEGINNING STUDY OF DATA
- ☐ EXPLORATION OF A VARIABLE: _____
- ☐ IN-DEPTH STUDY OF _____
- ☐ REVIEW OR CHECK OF EARLIER CONCLUSIONS
- ☐ OTHER _____

II. STATEMENT OF PURPOSE

III. ITEMS THAT WERE INTERESTING

IV. CONCLUSIONS (EVIDENCE MAY BE NECESSARY)

V. IDEAS TO CHECK ON NEXT TIME

EVIDENCE FOR CONCLUSIONS

CONCLUSIONS: _____

_____

EXHIBIT A

STATEMENT _____

_____

_____

_____

EXHIBIT B

STATEMENT _____

_____

_____

_____

NETWORK EXPLORATION WORKSHEET

Mailbox name for class you are using: _____

You will need your CLASS INFORMATION WORKSHEET.
You can use the back to draw the necessary graphs.

1. Does this class have larger families? _____

   Are there more students that are only children? _____

2. Do you think they have different fast food preferences than your class? _____

   Explain using SUMMARY STATEMENTS.

3. How do their least favorite subjects compare with your class? Try to describe the similarities or differences without using numbers.

4. Compare their TV watching habits with your class' by constructing a bar graph. Write a conclusion.

5. Do you think more allowance (or less) means more (or less) after school lessons? How does their crosstab compare?

6. Compare this class with yours for at least one of the graphs 6 - 8 on the CLASS INFORMATION WORKSHEET.

COSMIC DATA

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
1	DOSE	23	86	84	0	RED	YELLOW	13
2	DEES	21	70	72	9	ORANGE	GREY	12
3	DEM	1	37	2	0	BLUE	BALD	5
4	DEM	24	56	25	0	BLUE	BROWN	9
5	DEM	8	54	20	0	BLUE	BALD	9
6	DOSE	17	83	61	6	ORANGE	GREY	14
7	DEM	8	54	20	0	BLUE	BALD	9
8	DOSE	15	85	49	0	ORANGE	YELLOW	14
9	DEES	18	65	68	0	RED	BROWN	10
10	DEES	14	64	62	0	ORANGE	BROWN	10
11	DEES	23	74	79	0	ORANGE	BROWN	12
12	DEES	23	73	80	9	RED	GREY	12
13	DEM	5	44	11	0	BLUE	BALD	7
14	DEES	13	55	62	3	RED	GREY	8
15	DEM	4	43	9	0	BLUE	BALD	7
16	DOSE	28	104	98	0	ORANGE	YELLOW	17
17	DOSE	18	93	60	6	ORANGE	GREY	16
18	DEES	1	40	5	0	BLUE	YELLOW	6
19	DEES	16	63	70	6	RED	GREY	9
20	DOSE	16	89	56	0	ORANGE	YELLOW	14
21	DEES	15	65	69	6	RED	GREY	10
22	DEES	24	82	85	9	RED	GREY	14
23	DOSE	15	87	52	0	ORANGE	YELLOW	14
24	DEM	3	39	7	0	BLUE	BALD	6
25	DOSE	27	91	95	0	ORANGE	YELLOW	16
26	DEES	4	49	21	0	BLUE	YELLOW	8
27	DEM	25	56	23	0	YELLOW	BALD	10
28	DEES	11	54	57	3	ORANGE	GREY	9
29	DOSE	4	52	19	0	BLUE	BROWN	8
30	DOSE	22	97	83	9	ORANGE	GREY	15
31	DEM	12	54	25	0	BLUE	BROWN	9
32	DEES	16	65	71	0	RED	BROWN	10
33	DEES	21	72	74	0	RED	BROWN	11
34	DOSE	13	81	41	0	RED	YELLOW	12
35	DOSE	2	41	10	0	BLUE	BROWN	6
36	DEES	19	69	66	0	RED	BROWN	12
37	DEES	15	62	62	6	RED	GREY	10
38	DOSE	2	46	9	0	BLUE	BROWN	7
39	DOSE	16	91	55	6	ORANGE	GREY	14
40	DEES	2	42	9	0	BLUE	YELLOW	7
41	DOSE	27	103	107	9	ORANGE	GREY	17
42	DEES	25	67	77	0	RED	BROWN	11
43	DOSE	16	89	54	6	ORANGE	GREY	15
44	DEM	17	53	25	0	BLUE	BROWN	7
45	DOSE	18	96	64	6	ORANGE	GREY	16
46	DOSE	16	97	55	0	ORANGE	YELLOW	16
47	DEES	21	80	77	0	RED	BROWN	13
48	DEM	4	44	10	0	BLUE	BALD	7
49	DEES	23	70	78	0	RED	BROWN	11
50	DOSE	27	97	98	0	RED	YELLOW	15

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
51	DEM	25	57	22	0	YELLOW	BALD	9
52	DEM	7	51	16	0	BLUE	BALD	8
53	DEES	2	43	11	0	BLUE	YELLOW	6
54	DEES	13	55	59	0	RED	BROWN	9
55	DOSE	13	81	45	0	ORANGE	YELLOW	13
56	DEES	24	75	86	9	RED	GREY	13
57	DOSE	5	51	23	0	BLUE	BROWN	9
58	DEM	3	41	6	0	BLUE	BALD	6
59	DEES	2	42	10	0	BLUE	YELLOW	6
60	DOSE	2	43	9	0	BLUE	BROWN	6
61	DOSE	21	93	74	0	ORANGE	YELLOW	15
62	DEES	5	60	26	0	BLUE	YELLOW	9
63	DEES	5	48	24	0	BLUE	YELLOW	7
64	DEES	14	63	66	0	RED	BROWN	10
65	DOSE	18	87	65	0	ORANGE	YELLOW	13
66	DEES	23	76	84	9	RED	GREY	11
67	DEM	23	53	24	0	BLUE	BROWN	9
68	DOSE	19	98	69	6	RED	GREY	16
69	DOSE	26	92	88	9	ORANGE	GREY	16
70	DEES	1	36	5	0	BLUE	YELLOW	5
71	DEES	13	64	66	3	ORANGE	GREY	11
72	DEM	17	55	24	0	BLUE	BROWN	9
73	DEM	23	56	26	0	YELLOW	BALD	9
74	DEM	11	56	26	0	YELLOW	BALD	9
75	DEM	8	55	21	0	BLUE	BALD	9
76	DEES	15	65	67	0	RED	BROWN	11
77	DEES	21	73	75	9	RED	GREY	10
78	DOSE	28	93	101	0	ORANGE	YELLOW	14
79	DEES	11	59	54	0	RED	BROWN	10
80	DEM	17	51	25	0	BLUE	BROWN	8
81	DEM	15	56	25	0	YELLOW	BALD	8
82	DEM	8	56	19	0	BLUE	BALD	10
83	DOSE	11	83	34	3	ORANGE	GREY	12
84	DEES	18	65	68	0	RED	BROWN	11
85	DEES	17	66	73	0	RED	BROWN	10
86	DEM	5	47	13	0	BLUE	BALD	7
87	DEES	20	70	77	9	RED	GREY	12
88	DEES	3	44	17	0	BLUE	YELLOW	7
89	DEES	11	55	59	3	RED	GREY	8
90	DOSE	15	83	51	6	ORANGE	GREY	13
91	DOSE	12	78	36	0	ORANGE	YELLOW	12
92	DEM	1	35	2	0	BLUE	BALD	6
93	DOSE	12	80	37	0	ORANGE	YELLOW	13
94	DEES	2	40	10	0	BLUE	YELLOW	7
95	DEM	4	44	9	0	BLUE	BALD	7
96	DEES	2	40	8	0	BLUE	YELLOW	6
97	DOSE	17	84	52	0	ORANGE	YELLOW	12
98	DEES	2	43	9	0	BLUE	YELLOW	7
99	DEM	17	50	25	0	BLUE	BROWN	8
100	DOSE	13	91	41	0	ORANGE	YELLOW	14

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
101	DEES	2	44	10	0	BLUE	YELLOW	7
102	DOSE	3	49	15	0	BLUE	BROWN	7
103	DEES	24	83	79	0	RED	BROWN	12
104	DOSE	13	80	44	0	ORANGE	YELLOW	13
105	DOSE	18	87	68	6	ORANGE	GREY	13
106	DEES	21	90	77	0	RED	BROWN	13
107	DEES	24	71	79	9	RED	GREY	11
108	DEES	11	60	53	0	RED	BROWN	9
109	DEES	21	71	78	0	RED	BROWN	11
110	DOSE	22	92	80	9	ORANGE	GREY	16
111	DOSE	17	80	57	6	ORANGE	GREY	12
112	DEES	14	64	60	3	ORANGE	GREY	10
113	DEES	16	64	66	6	RED	GREY	10
114	DOSE	4	55	19	0	BLUE	BROWN	9
115	DEES	24	80	91	9	RED	GREY	12
116	DOSE	27	101	106	9	ORANGE	GREY	16
117	DEES	20	65	70	9	ORANGE	GREY	11
118	DOSE	30	97	106	0	ORANGE	YELLOW	16
119	DEES	23	73	77	0	RED	BROWN	12
120	DEES	14	63	61	3	RED	GREY	10
121	DEM	24	51	27	0	BLUE	BROWN	8
122	DOSE	19	82	69	6	RED	GREY	13
123	DEES	12	59	59	3	RED	GREY	9
124	DEES	24	72	78	9	ORANGE	GREY	11
125	DEM	16	56	24	0	YELLOW	BALD	9
126	DEES	21	75	85	9	RED	GREY	12
127	DOSE	4	53	19	0	BLUE	BROWN	8
128	DEES	11	61	55	0	ORANGE	BROWN	9
129	DEES	12	65	55	3	RED	GREY	11
130	DEES	19	72	71	6	RED	GREY	12
131	DEES	24	75	74	9	ORANGE	GREY	12
132	DEES	2	43	9	0	BLUE	YELLOW	7
133	DEES	17	63	64	6	RED	GREY	8
134	DOSE	2	38	9	0	BLUE	BROWN	6
135	DEM	19	58	23	0	BLUE	BROWN	9
136	DOSE	11	75	35	0	ORANGE	YELLOW	12
137	DOSE	11	79	32	3	ORANGE	GREY	12
138	DOSE	26	90	93	9	ORANGE	GREY	15
139	DEES	21	75	76	9	RED	GREY	11
140	DEES	11	59	60	3	RED	GREY	10
141	DEM	15	56	26	0	BLUE	BROWN	9
142	DEES	16	66	62	0	RED	BROWN	10
143	DEM	14	53	27	0	BLUE	BROWN	9
144	DOSE	19	89	61	6	RED	GREY	15
145	DEM	5	45	11	0	BLUE	BALD	7
146	DOSE	19	96	65	9	ORANGE	YELLOW	15
147	DOSE	23	88	77	9	ORANGE	GREY	14
148	DEES	2	41	10	0	BLUE	YELLOW	6
149	DOSE	1	40	5	0	BLUE	BROWN	6
150	DEES	17	73	69	0	RED	BROWN	11

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
151	DEES	18	72	75	6	ORANGE	GREY	11
152	DEES	15	65	66	6	RED	GREY	11
153	DEES	24	78	84	0	RED	BROWN	12
154	DOSE	13	60	40	0	ORANGE	YELLOW	13
155	DEM	17	54	26	0	YELLOW	BALD	9
156	DEES	18	64	77	6	ORANGE	GREY	10
157	DOSE	18	89	59	0	ORANGE	YELLOW	14
158	DEES	22	81	82	0	RED	BROWN	13
159	DEM	5	42	12	0	BLUE	BALD	6
160	DEM	3	40	6	0	BLUE	BALD	7
161	DEES	1	39	5	0	BLUE	YELLOW	7
162	DEES	24	76	73	9	RED	GREY	12
163	DEES	23	76	78	9	RED	GREY	13
164	DEM	20	47	24	0	BLUE	BROWN	7
165	DEES	3	44	15	0	BLUE	YELLOW	6
166	DEM	3	41	7	0	BLUE	BALD	7
167	DEM	16	51	23	0	BLUE	BROWN	7
168	DEES	17	72	69	6	RED	GREY	11
169	DEES	24	80	93	0	RED	BROWN	13
170	DOSE	18	96	63	6	ORANGE	GREY	14
171	DEES	24	80	89	9	ORANGE	GREY	13
172	DEES	17	64	72	6	RED	GREY	10
173	DOSE	5	51	25	0	BLUE	BROWN	8
174	DEES	13	62	65	0	RED	BROWN	10
175	DEES	12	58	60	0	RED	BROWN	8
176	DEES	17	64	71	0	RED	BROWN	10
177	DEES	2	43	9	0	BLUE	YELLOW	6
178	DOSE	28	93	104	9	ORANGE	GREY	14
179	DOSE	4	54	19	0	BLUE	BROWN	9
180	DEES	5	54	24	0	BLUE	YELLOW	9
181	DOSE	17	86	59	0	ORANGE	YELLOW	14
182	DEES	4	53	20	0	BLUE	YELLOW	8
183	DEM	16	54	23	0	YELLOW	BALD	8
184	DOSE	5	62	25	0	BLUE	BROWN	9
185	DEES	24	79	81	0	RED	BROWN	13
186	DEES	19	64	74	6	RED	GREY	10
187	DEES	3	45	16	0	BLUE	YELLOW	7
188	DEES	1	39	4	0	BLUE	YELLOW	6
189	DEES	21	82	81	9	RED	GREY	13
190	DOSE	16	83	57	0	RED	YELLOW	13
191	DOSE	12	85	35	3	RED	GREY	14
192	DOSE	27	92	84	0	ORANGE	YELLOW	15
193	DOSE	11	75	32	0	ORANGE	YELLOW	13
194	DOSE	11	81	32	3	ORANGE	GREY	14
195	DOSE	25	87	83	0	ORANGE	YELLOW	13
196	DEES	17	71	69	0	ORANGE	BROWN	12
197	DEES	21	72	79	9	ORANGE	GREY	11
198	DOSE	27	98	94	9	ORANGE	GREY	14
199	DOSE	1	38	4	0	BLUE	BROWN	6
200	DEM	20	57	27	0	BLUE	BROWN	9

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
201	DOSE	25	100	87	9	ORANGE	GREY	16
202	DEES	14	57	66	3	ORANGE	GREY	9
203	DEES	14	64	57	3	ORANGE	GREY	10
204	DOSE	14	85	43	3	ORANGE	GREY	14
205	DEES	3	44	16	0	BLUE	YELLOW	7
206	DEES	14	61	62	0	RED	BROWN	10
207	DEES	21	71	72	0	RED	BROWN	11
208	DOSE	28	97	103	0	RED	YELLOW	14
209	DOSE	3	49	13	0	BLUE	BROWN	7
210	DEES	15	68	62	0	RED	BROWN	10
211	DEM	16	52	25	0	YELLOW	BALD	8
212	DEM	22	50	26	0	YELLOW	BALD	8
213	DEES	20	76	78	9	ORANGE	GREY	13
214	DEES	25	88	88	0	RED	BROWN	14
215	DEES	17	65	69	6	ORANGE	GREY	10
216	DEM	4	42	10	0	BLUE	BALD	7
217	DEES	18	74	70	0	RED	BROWN	12
218	DEES	3	44	13	0	BLUE	YELLOW	6
219	DEES	4	44	19	0	BLUE	YELLOW	7
220	DEES	15	69	63	0	RED	BROWN	11
221	DEM	16	56	25	0	YELLOW	BALD	9
222	DOSE	12	85	37	3	ORANGE	GREY	13
223	DOSE	17	88	58	6	ORANGE	GREY	14
224	DEES	12	60	60	0	RED	BROWN	10
225	DEES	5	57	26	0	BLUE	YELLOW	10
226	DEES	1	39	5	0	BLUE	YELLOW	6
227	DOSE	27	95	95	9	ORANGE	GREY	16
228	DOSE	26	96	90	0	ORANGE	YELLOW	16
229	DEES	4	46	19	0	BLUE	YELLOW	7
230	DEES	2	43	10	0	BLUE	YELLOW	7
231	DEES	18	74	68	0	RED	BROWN	12
232	DEES	14	62	59	0	RED	BROWN	11
233	DOSE	17	100	58	6	RED	GREY	16
234	DOSE	13	76	40	3	ORANGE	GREY	12
235	DEES	22	75	83	9	RED	GREY	11
236	DEES	5	52	24	0	BLUE	YELLOW	8
237	DEES	16	65	68	0	RED	BROWN	10
238	DEES	14	59	58	3	RED	GREY	10
239	DEES	20	73	73	0	RED	BROWN	12
240	DEES	3	46	14	0	BLUE	YELLOW	7
241	DEES	1	37	5	0	BLUE	YELLOW	5
242	DEES	23	79	77	9	RED	GREY	13
243	DOSE	22	85	73	9	RED	GREY	12
244	DOSE	23	92	79	9	RED	GREY	15
245	DEES	11	53	55	0	RED	BROWN	8
246	DOSE	24	87	85	9	ORANGE	GREY	15
247	DOSE	5	55	24	0	BLUE	BROWN	9
248	DEES	3	45	14	0	BLUE	YELLOW	7
249	DOSE	24	89	91	9	ORANGE	GREY	13
250	DEES	16	65	70	6	ORANGE	GREY	11

CASE	SEX	AGE	HEIGHT	WEIGHT	KIDS	EYES	HAIR	FEET
251	DOSE	2	44	10	0	BLUE	BROWN	7
252	DEES	21	70	72	0	ORANGE	BROWN	12
253	DOSE	12	86	38	0	ORANGE	YELLOW	13
254	DEM	9	56	22	0	BLUE	BALD	8
255	DEES	22	76	81	9	ORANGE	GREY	12
256	DOSE	18	86	63	0	ORANGE	YELLOW	14
257	DOSE	13	74	41	3	ORANGE	GREY	12
258	DEES	2	41	10	0	BLUE	YELLOW	6
259	DEM	9	55	20	0	BLUE	BALD	9
260	DEM	20	53	25	0	YELLOW	BALD	9
261	DOSE	3	48	13	0	BLUE	BROWN	7
262	DOSE	3	45	15	0	BLUE	BROWN	7
263	DEES	11	59	55	3	RED	GREY	9
264	DOSE	5	61	24	0	BLUE	BROWN	10
265	DEM	22	50	22	0	YELLOW	BALD	8
266	DEM	24	56	23	0	BLUE	BROWN	8
267	DOSE	3	51	14	0	BLUE	BROWN	9
268	DEES	17	68	69	6	RED	GREY	10
269	DEES	3	48	16	0	BLUE	YELLOW	7
270	DEES	18	68	73	0	RED	BROWN	10
271	DOSE	28	93	109	9	ORANGE	GREY	14
272	DOSE	5	56	25	0	BLUE	BROWN	9
273	DEES	18	72	69	6	RED	GREY	11
274	DEM	7	51	17	0	BLUE	BALD	8
275	DEM	15	55	25	0	YELLOW	BALD	9
276	DOSE	24	94	90	0	ORANGE	YELLOW	16
277	DEES	3	46	15	0	BLUE	YELLOW	7
278	DEES	18	71	76	6	RED	GREY	11
279	DEM	21	60	24	0	BLUE	BROWN	8
280	DOSE	21	86	69	0	RED	YELLOW	14
281	DOSE	11	78	35	3	ORANGE	GREY	11
282	DEM	11	56	26	0	YELLOW	BALD	9
283	DOSE	11	84	31	0	ORANGE	YELLOW	14
284	DEES	22	81	79	0	RED	BROWN	13
285	DEES	25	79	86	9	RED	GREY	14
286	DEES	12	60	60	0	RED	BROWN	9
287	DEES	17	69	70	0	RED	BROWN	10
288	DOSE	22	94	78	9	RED	GREY	16
289	DEES	16	67	69	6	ORANGE	GREY	11
290	DEES	11	53	57	3	RED	GREY	8
291	DOSE	21	95	79	0	ORANGE	YELLOW	15
292	DEES	3	46	14	0	BLUE	YELLOW	7
293	DEES	11	55	58	3	RED	GREY	9
294	DEES	11	58	56	0	RED	BROWN	9
295	DEM	25	55	25	0	BLUE	BROWN	9
296	DOSE	22	97	75	0	ORANGE	YELLOW	16
297	DOSE	26	97	103	9	ORANGE	GREY	17
298	DEM	22	56	23	0	BLUE	BROWN	9
299	DOSE	14	92	46	3	ORANGE	GREY	16
300	DEES	3	42	15	0	BLUE	YELLOW	6

COSMIC EXPLORER

SCIENCE OFFICER'S MANUAL

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SUMMARY

There are many ideas to try in searching for information from the data. The use of LIMITING VARIABLES is particularly important in making comparisons between groups. LIMITING VARIABLES can also be used to look at smaller subgroups of a particular variable. You are able, for example, to compare males taller than 100 cm. with females shorter than 100 cm. Red-headed tall people could be compared with brown-haired tall people. You have to decide what you think is important or interesting.

Finally, don't overlook the DATA LIST option. You can often get additional information and new ideas by looking carefully at the DATA LIST for clues.

There are many unusual ideas and people to learn about as science officer on the **COSMIC EXPLORER. GOOD HUNTING!**

INTRODUCTION

As Science officer on board the **COSMIC EXPLORER**, you will be responsible for making conclusions about the planets and any life forms that may exist.

Data will be made available to you through your computer. The data will consist of information about the individuals from the planet being explored.

Your task will be to examine the data, decide what variables you want to study, and report your conclusions. You will keep a careful record of all your explorations and conclusions in the SCIENCE OFFICER'S LOG.

IMPORTANT

In order to proceed, you must be familiar with the DATA SEARCH program.

HOW TO BEGIN

Each SCIENCE OFFICER'S LOG SHEET is your record of an exploration you have done. There are five items on the front side of each log sheet. The back of the page is for evidence. What follows is a brief description of each item with examples to help you.

I. TYPE OF RESEARCH

The box you check tells what stage you're working on: beginning, middle, or end.

BEGINNING STUDY OF DATA
This is checked when you first start. You will probably reach no conclusions at this time, but at the end of this study you should have a good idea what information is available.

EXPLORATION OF A VARIABLE
After deciding what variable you want to explore, you check this box and try to find out as much as you can about that variable.

IN-DEPTH STUDY OF_____
This is checked when you want to make a further study of a variable, or combination of variables, that interest you.

REVIEW OR CHECK OF EARLIER CONCLUSION
to provide evidence or to check out a new idea about your conclusion.

EVIDENCE FOR CONCLUSIONS

CONCLUSIONS: _____

_____

EXHIBIT A

STATEMENT _____

_____

_____

_____

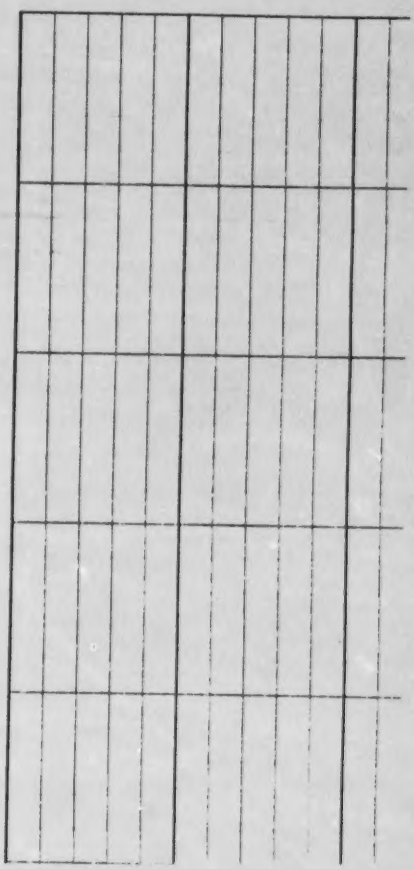
EXHIBIT B

STATEMENT _____

_____

_____

_____



EVIDENCE FOR CONCLUSIONS

Some conclusions will require evidence to prove them. The evidence page is on the back of each SCIENCE OFFICER'S LOG SHEET. There are three types of recording you are to do on this side.

1. **CONCLUSION** - This is a copy of the conclusion you made on the SCIENCE OFFICER'S LOG SHEET.

2. **STATEMENT** - These are ideas you want to point out to help you prove your conclusion. There is space for two statements; others may be attached if needed.

3. **GRAPH** - This graph is a picture to display the data for your statement and/or conclusion. This is copied from the screen with the important variables and numbers filled in.

GROUP NAMES < SAMPLE > _____ _____ _____

SCIENCE OFFICER'S LOG SHEET

I. TYPE OF RESEARCH (CHECK ONE)

- ☐ BEGINNING STUDY OF DATA
- ☐ EXPLORATION OF A VARIABLE: _____
- ☐ IN-DEPTH STUDY OF _____
- ☐ REVIEW OR CHECK OF EARLIER CONCLUSIONS
- ☐ OTHER _____

II. STATEMENT OF PURPOSE

III. ITEMS THAT WERE INTERESTING

IV. CONCLUSIONS (EVIDENCE MAY BE NECESSARY)

V. IDEAS TO CHECK ON NEXT TIME

II. STATEMENT OF PURPOSE

This is the place to tell why you are doing what you are doing. Be clear; use complete sentences. A question about what you want to check is often useful.

Example 1. We want to investigate what data is available to work on. Can we find an interesting variable or combination of variables for our study?

Example 2. We want to study hair color to see if it is related to eye color. Also, does the most common hair color change for different ages?

Example 3. We think that the taller individuals have fewer children than shorter ones. Do shorter parents have more children?

III. ITEMS THAT WERE INTERESTING

This is a record of things you noticed as you were looking at the data. You might record things that someone else might want to study or things that would help a different group if they knew about them.

Example 1. We noticed that there were no children with brown hair.

Example 2. It seems that one-fourth of the people have blue eyes.

Example 3. The youngest parent we noticed was only eleven years old.

IV. CONCLUSIONS

This is where you record what you found out. Ideally, it will be an answer to the question in your STATEMENT OF PURPOSE. You may need to complete an evidence page to support your conclusions.

Example 1. We noticed that all the people with red hair have blue eyes.

Example 2. We discovered that the older a person is, the taller he becomes. We also noticed that there are more older people with green eyes than with brown eyes.

Example 3. Females with blue eyes are shorter than females with brown eyes.

V. IDEAS TO CHECK ON NEXT TIME

This is your chance to follow up something interesting. If you notice something about your variable but don't have time to check it now, you can note it here.

Example 1. We think that about half of the redheaded females have no children, but all the redheaded males seem to have children.

Example 2. It seems as if the taller individuals have no hair. Maybe it depends on their age or their sex.

Example 3. We can't figure out why there are no people who weigh more than 25 kilograms.

DATAMAKER MANUAL

Math Network Curriculum Project

October, 1982

Version 1.9

INTRODUCTION

The DATAMAKER program is part of the DATA ANALYSIS unit of the Math Network Curriculum project. It requires a Commodore PET computer with at least 16K of user memory running in BASIC 3.0 or greater. It does not require a disk drive, but will work more easily with one. With a modem, data can be saved on and loaded from the MNCP Network.

PURPOSE OF THE PROGRAM

As a part of the Data Analysis Unit, DATAMAKER allows you to create and edit files of data and store them on tape or on the MNCP Network. These files are then used by the **DATASEARCH** program which allows you to make listings, bar graphs, and crosstabs of your data.

An Example

Suppose that you have some questionnaire data that you have gathered and that the questionnaire had three questions:

1. AGE
2. SEX
3. HAIR COLOR

LOADING THE DATA FROM THE KEYBOARD

Basically, you would like to type in this data and later use the **DATASEARCH** program to examine the results. After LOADing and RUNning the program, four choices appear:

A. LOAD NEW DATA
B. SEE NETNAMES OF DATA
C. DELETE DATA FROM NETWORK
D. QUIT

Choice B would be appropriate if you already had some data stored on the network but had forgotten its name. Choice C would be used when you were ready to get rid of some data on the network.

You now choose **A** (and hit <return>).

Three new choices appear:

A. FROM KEYBOARD
B. FROM TAPE
C. FROM DISK
D. FROM NETWORK

You are going to have to type in this data and so will choose **A**.

ENTERING THE VARIABLES

Before you can type in the information for the individual people in your survey, you are going to have to tell **DATAMAKER** something about the questions. Each question constitutes a **variable.** You must choose a name for each variable. The name for the variable for the first questions would probably be **AGE.**

The you are asked whether this variable is **Numeric** or **Discrete. AGE** is clearly a **Numeric** variable since it has numbers for values, so you choose **N.**

Now you are asked for the second variable name, and you would probably type **SEX.** Then choose **D** since this is a discrete variable. The program now asks you to specify what values **SEX** can take. That is, what are the possible answers? Ideally you would type **MALE** for one, and **FEMALE** for the other. But this is not allowed. There are a number of limitations in DATAMAKER. This particular limitation is that **the values of discrete variables can be at most 4 letters long.** (The reason for this has to do with managing to fit words onto the graphs that are drawn by DATASEARCH.) So you have to abbreviate **FEMALE** to something like **FMLE.**

If you make a mistake while you are entering variables or their values, you can correct by using the <DEL> key to backspace within one word and **holding down the shift key and typing @** when you want to go back further.

DATAMAKER, of course, has no idea how many discrete values **SEX** can take on, so you have to signal that you have typed them all in. You do this by **holding down the shift key and pressing &.** This is the standard way in **DATAMAKER** and in **DATASEARCH** to indicate that you are done with something.

When you go to name the third variable you will probably encounter another limitation of **DATAMAKER.** If you try to type in the complete name **HAIR COLOR** you see that the program stops accepting letters after the fifth one. **Variable names must be no longer than 5 letters.** So shorten this variable name to **HAIR.**

Suppose you got the answers brown, black, blond, red, white, and gray to the answer about hair color. You already know that you are going to have to make up abbreviations for most of these. But you will also find that

DATAMAKER will only let you specify 5 discrete values. Here you have six. (The reasons for this again have to do with formatting the graphs that get drawn in DATASEARCH.) So, in a case like this, you are going to have to combine some possible responses. Here, it would be reasonable to combine **WHITE** and **GRAY** to just **GRAY**. In some cases you might want to create a category called **OTHR**.

How are you going to indicate that you have no more variables to put in? When **DATAMAKER** asks you for the fourth variable name, you **hold down the shift key and type &** so that you can go on to the next part in which you learn how to enter the data itself.

ENTERING THE DATA

On the screen you will see:

```
ADDING CASES
HOLD DOWN SHIFT AND TYPE & WHEN DONE
  case number 1
    AGE:
```

whereupon you type in the age of the first person. Then you are asked for their sex. You would type **MALE** or **FMLE**. If you make a mistake in typing, DATAMAKER prompts you by showing you the possible values. The same thing happens for **HAIR**.

Go along, entering case after case. If you discover you have made a mistake after having gone on to the next value or case, don't worry. You can go back later and edit your data. Just keep going through to the end. Then **hold down the shift key and type &** to indicate you are done.

After finishing, you will find yourself back at DATAMAKER's main menu, but that now there are some additional choices. These additional choices arise because, now that you have some data present, there are additional things you can do.

SAVING YOUR DATA

The first thing you should do is SAVE your data! This is because, in case anything goes wrong after this, you at least won't have to retype your data. You can just reload it in from tape. So choose **G**.

You can **SAVE** on **TAPE, DISK**, or **NETWORK**. Assume here that you are going to use tape. So choose **A** for tape.

Be sure you remove your program tape! You don't want to accidentally erase the program. Now put in the tape you are going to use to store the data.

You can give your data a name if you like. That way, you can store several sets of data on one tape. On the other hand, you don't have to store the data with a name. Let's suppose here that you name your data **QUESTIONNAIRE.** **Names of data files can have at most 16 letters** - another limitation. After typing in this name (and pressing <return>) you will be asked to **PRESS PLAY AND RECORD ON TAPE #1** which you can now do, just as though you were SAVEing a program.

After a little while **DATAMAKER** will tell you that it has finished saving your data.

LIST DATA

Probably, you would like to scan your data to catch any obvious mistakes. Choosing option **E** from the main menu allows this. First you are asked whether to list to the **Screen** or the **Printer.** **If you do not have a printer, be sure you choose the screen.** Otherwise the program will stop and you will have to reload your data from the tape you made.

You will first see the variables listed and then the actual data. If there are more variables than will fit on a single line of the screen, the data will be somewhat hard to read because the values will not quite line up in columns.

EDIT OR APPEND DATA

Probably you will find some mistake you made. As the data goes by on the screen, note the numbers of those cases which have bad data in them. Then, when you get back to the main menu, choose option **F.** You will now be asked which case you want to edit. Type in the number of one of the faulty cases. You will see the first variable of that case appear and the blinking gray cursor will be right at the end of it, as though you had just finished typing it in. If this value is OK, just type <return>. If it is wrong, you can backspace (as normal with the <DEL> key) and retype it correctly. The next value will come up when you are done. In fact, you can step through any amount of the data by just continuing to hit <return>. When you reach the end of the data, you can enter more data, if you wish. Just **hold down the shift key and type &** when you are done.

ADDING A NEW VARIABLE

At some time, it will probably happen that you want to add a new variable to your data. For example, you might add **EYE COLOR** to the data from the questionnaire. With the previous data still loaded (or loaded again from tape), just go back to option **A** which is **LOAD NEW DATA** and choose **from keyboard** again. This time, you will be asked if you want to:

A. APPEND NEW DATA
B. ADD A NEW VARIABLE

Obviously, you choose B. Now you will specify a new variable, just as you specified the original variables. But when you are done, you will have to type in the data for the new variable for each case that is present.

OTHER THINGS YOU CAN DO

1. **Save and Load on Disk**
   If you have a disk drive with your PET, you can use it to save and load data. You will be asked for the drive number and the name of the data file. Whereas the name is optional for data files on tape, you **must** specify a name for a data file on disk (since there is no natural 'next' file on a disk).

2. **See Net Names of Data**
   The MNCP Network is an alternative place to load and save data. You will need to be able to browse the names of the data files that are stored there. Choosing this option (B in the main menu) will ask you first if you have dialled the Network (answer **N** the first time). Then it will ask if you have a modem (answer **Y**). Finally, it will ask you what the files names should begin with. If you just type <return>, you will see all the names of the data. If you type a few letters (e.g. MY), you will see all the data file names that begin that way (so you might see MYDATA, MYCLASSDATA, MYOPIC, ...).

3. **Save and Load on the MNCP Network**
   If you have your PET connected to a phone, you can save and load data from DATAMAKER onto the MNCP Network. One reason you want might to SAVE data on the Network is so that other people can access it. Conversely, you will want to LOAD from the Network so that you can make a tape of it to be used with the DATASEARCH program. When you choose one of these options, you will be asked if you have dialled the network and whether you have a modem just as for seeing the names of the data files on the network. Otherwise, the process is not much different than SAVEing or LOADing from tape except that you **must** specify the name of data (whereas the name was an option in using tape). You must also give your group name when you save the data. This is so no one but you can delete it (see below).

4. **Deleting from the MNCP Network**
   There will come a time when you no longer want a certain set of data to be out there on the MNCP Network. Option C in the main menu allows you to delete data from the Network. You will need to know the name of the data file. You will also be asked for your name. Answer the same way you did when you stored the data.

5. **Clear Data from Workspace**
   Sometimes you will simply want to start over again. Choosing option H in the main menu gets rid of all the data you have typed in or loaded

from tape or from the network. If you have made modifications to the data and have not saved it somewhere, you will be given a chance to change your mind (in case you got there by accident).

6. **Quit**

When you want to stop the program, you can choose option D from the main menu. If you want to make a backup copy of the program, you must either make the backup copy **before you run DATAMAKER** or after you have used the quit option. **You will not get a good copy if you press <RUN/STOP> and then try to do a normal SAVE.**

LIMITATIONS OF DATAMAKER

1. There can be at most 20 variables.
2. A discrete variable can have at most 5 discrete values.
3. The maximum number of items of information which can be handled at one time is 600. If you have 20 variables, that would mean you could handle at most 30 individuals or cases.
4. The maximum length of a variable name is 5 characters.
5. The maximum length for the name of a discrete value is 4 characters.
6. Numeric values must be greater than or equal to zero and less than 223. (Negative values are not allowed.)
7. Once you have created all you variables and discrete values, you cannot edit them. (However, you can add new variables.)
8. When saving and loading data to and from tape, cassette port 1 is always assumed.

COSMIC 1.4

```
READY.

 10 SYS1039:RUN
READY.


READY.

 5 REM COSMIC EXPLORER 1.4
 6 REM BY THE MATH NETWORK CURRICULUM PROJECT, SFSU, COPYRIGHT, 1981
 9 VERS=1.4
 10 GOTO1000
 100 REM CASE
 110 MD=TR:G1=FA:IFRSTHENPO=0:RS=FA:P(0)=0:P(1)=0
 120 ES=FA:GETA$:ON-(A$=CHR$(3))-2*(A$="-")-3*(A$=" ")GOTO1050,240,260
 130 PO=PO+1:IFPO>300THENMD=FA:GOTO250
 140 PRINT"■"D$"■■■■□"PO"▌▌  ":D=LM+PO*8
 150 FORA=0TO-DG:GC=TR:IFDG=FAANDGR=1THENA=1
 160 FORN=0TO2:IFLI%(0,N,0)=0THEN210
 170 LI=LI%(0,N,0):DT=(PEEK(D+LI)):IFVA$(LI,2)<>""THEN200
 180 GC=DT>=LI%(A,N,1)ANDDT<=LI%(A,N,2):IFGCTHEN210
 190 N=2:GOTO210
 200 GC=LI%(A,N,DT)OR(LI%(A,N,2)=999):IFGC=0THENN=2
 210 NEXT:IFGC=0THEN230
 220 P(A)=P(A)+1:G1=TR:PRINT"■"D$TAB(-4*(GA=1)-8*A*(GA=0))P(A)
 230 NEXTA:ON-(G1-1)GOTO120,250
 240 ES=TR
 250 RETURN
 260 PRINT"■"D$TAB(16)RE$:GETA$:IFA$<>R$ANDA$<>"P"THEN260
 270 IFA$="P"THENPRINTTAB(16)"□  "SP$SP$SP$SP$:GOSUB8000
 280 PRINT"■"D$TAB(16)PS$"  ":GOTO130
 300 REM LIST
 310 NL=NL+1:GOSUB100:IFMD=FAORESTHEN370
 320 T=0:FORN2=1TO8:IFNOTFL%(N2)THEN360
 330 PRINT"■"TAB(14+5*T)LEFT$(D$,NL+1);:T=T+1
 340 IFFNNUM(N2)THENPRINTPEEK(D+N2);:GOTO360
 350 PRINTLEFT$(VA$(N2,PEEK(D+N2)),4);
 360 NEXTN2:PRINT:IFNL<20THEN310
 370 RETURN
 400 REM BAR GR
 410 GOSUB100:IFMD=FAORESTHENGC(0)=0:GC(1)=0:RETURN
 420 FORG=0TO-DG:IFDG=FAANDGR=1THENG=1
 430 IFP(G)=<GC(G)THEN495
 440 GC(G)=P(G):B1=INT((PEEK(D+MV(0))-MI)/BS)+1:IFB1>50RB1<1THEN495
 450 GR%(G,B1)=GR%(G,B1)+1
 460 T=GR%(G,B1)-INT(GR%(G,B1)/Z)*Z:IFT<>1ANDZ<>1THEN495
 470 IFGR%(G+4,B1)>14THENGOSUB500:GOTO460
 480 PRINT"■"TAB(G+17+4*B1)LEFT$(D$,15-GR%(G+4,B1));
 485 IFGR%(G+2,B1)THENPRINTMID$("▒▒",G+1,1):GR%(G+2,B1)=FA:GOTO495
 490 GR%(G+4,B1)=GR%(G+4,B1)+1:PRINTDP$(G):GR%(G+2,B1)=TR
 495 NEXT:GOTO410
 500 REM SCALE
 510 Z=Z*2:FORN2=0TO1:FORN=1TO5:GR%(N2+4,N)=GR%(N2+4,N)/2:IFGR%(N2,N)=0THEN560
 520 PRINT"■"TAB(N2+17+4*N)LEFT$(D$,15-GR%(N2+4,N));
 530 GR%(2+N2,N)=FA:IFN2=0THENPRINT"▒□▌";:GOTO550
 540 PRINT"▒□▌";
```

```
550 FORN1=1TO14-GR%(N2+4,N):PRINT" ■■";:NEXT
560 NEXT:NEXT:GOSUB600:RETURN
600 REM NUM Y
610 PRINT"■"TAB(14);LEFT$(D$,15);
620 SR$="■■■■":N=0:T$="■■■■■■■■"
630 FORN1=1TO7:PRINTNLEFT$(SR$,4-LEN(STR$(N)))T$;:N=N1*5*Z
640 IFN1-INT(N1/2)*2>0 THENPRINT"■";
650 NEXT:RETURN
700 REM LMTS
710 IFMV(AX)<>0THEN740
720 PRINT"■"TAB(14)LEFT$(D$,20)"■MISSING MAIN VARIABLE■"
730 PRINTTAB(16)RE$;:LN=0:GOSUB5200:ES=TR:RETURN
740 IFNOTFNNUM(MV(AX))THENMA=5:MI=1:RETURN
750 MA=0:MI=999:RS=TR:PRINT"■"D$TAB(16)"ONE MOMENT PLEASE    "
760 FORN1=1TO20:GOSUB100:IFESTHENRETURN
762 IFNOTMDTHENN=20:GOTO790
770 IFMA<PEEK(D+MV(AX))THENMA=PEEK(D+MV(AX))
780 IFMI>PEEK(D+MV(AX))THENMI=PEEK(D+MV(AX))
790 NEXT:IFP(GR)<1THENPRINT"■"D$TAB(21)"■TRY NEW LIMITS":GOTO730
795 PRINT"■"D$"■"SP$SP$:PRINTSP$SP$"    ":RETURN
800 REM DO CRSTB
810 GOSUB100:ON-(MD=FA)-2*(ES=TR)GOTO860,870
820 B1=5:B2=5:FORN=1TO5:IFPEEK(D+MV(0))<=BM%(0,N)THENB1=N:N=5
830 NEXT:FORN=1TO5:IFPEEK(D+MV(1))<=BM%(1,N)THENB2=N:N=5
840 NEXT:GR%(B1,B2)=GR%(B1,B2)+1
850 PRINT"■■■■"TAB(16+4*B1)LEFT$(D$,15-3*B2)GR%(B1,B2):GOTO810
860 PRINT"■"TAB(16)D$RE$;:LN=0:GOSUB5400
870 RETURN
1000 REM MAIN
1010 PRINT"■"CHR$(142):GOSUB1200:POKE59468,14:GOSUB7800:POKE59468,12:GOSUB4000
1020 GOSUB1400
1030 ONGA+1GOSUB1800,1600
1040 IFESTHENCLR:GOSUB1200:GOTO1020
1050 PRINT"■":POKE59468,12:POKE40,1:POKE41,4
1060 PRINT"GOODBYE!":PRINT"TO LIST THIS PROGRAM, PRESS RETURN TWICE
1070 PRINT"■■POKE 40,122:POKE 41,13:LIST■■■■■":POKE144,P:END
1200 REM INIT
1210 MD=0:N=0:B1=0:GR=0:T=0:Z=1:PO=0:RS=0:ES=0:LM=1040:TR=-1:FA=0:CB=1
1220 DIMGR%(5,5),BM%(1,5),LI%(1,2,5),VA$(8,6):DEFFNNUM(X)=(VA$(X,2)="")
1230 MV$="MAIN VARIABLE":D$="■■■■■■■■
```

```
1650 MA$="G":LN=1:GOSUB5400:IFESTHENRETURN
1660 IFACTHEN1640
1670 ONAGOSUB1690,1690,1700,1700,1700,1710,1720
1680 GOTO1600
1690 MV=A-1:GOSUB2000:RETURN
1700 LI=A-3:GOSUB2200:RETURN
1710 GOSUB2800:RETURN
1720 GOSUB3200:RETURN
1800 REM BAR GR MENU
1810 GOSUB6000:PRINT"■A■ "MV$:PRINTTAB(15)"■B■ "LV$1R$TAB(15)"■C■ "LV$2
1820 PRINTTAB(15)"■D■ "LV$3R$TAB(15)"■E■ CHANGE GROUP NUMBER
1830 PRINTTAB(15)"■F■ DO DATA LIST"R$TAB(15)"■G■ DO "GA$
1840 PRINTTAB(15)"■H■ DOUBLE GROUP BAR GRAPH":GOSUB4600
1850 PRINT"■■■■"TAB(29)"SELECT  ■";
1860 MA$="H":LN=1:GOSUB5400:IFESTHENRETURN
1870 IFACTHEN1850
1880 ONAGOSUB1900,1910,1910,1910,1920,1930,1940,1950
1890 GOTO1800
1900 MV=0:GOSUB2000:RETURN
1910 LI=A-2:GOSUB2200:RETURN
1920 GR=1-GR:RETURN
1930 GOSUB2800:RETURN
1940 Z=1:GOSUB3200:RETURN
1950 Z=1:GOSUB3800:RETURN
2000 REM MAIN VAR
2010 GOSUB6000:PRINT"■"MV$"■  ";:IFGA=1THENPRINT"■■■"MV+1;
2020 PRINT:FORN=1TO8:PRINTTAB(15)"■■"CHR$(N+64)"■ "VA$(N,0):NEXT
2030 PRINT"■■■■■■"TAB(31)"SELECT ";:MA$=CHR$(72):LN=1:GOSUB5400:IFESTHENRETURN
2040 IFACTHEN2030
2050 MV(MV)=A:RETURN
2200 REM LMT VAR
2210 GOSUB6000:PRINT"■LIMIT VARIABLE"RIGHT$(STR$(LI+1),1)
2220 FORN=1TO8:PRINTTAB(15)"■■"CHR$(N+64)"■ "VA$(N,0):NEXT
2230 PRINTTAB(15)"■■"CHR$(N+64)"■ DELETE LIMIT VARIABLE"
2240 PRINT"■"LEFT$(D$,5)TAB(31)"SELECT ";:MA$=CHR$(N+64):LN=1:GOSUB5400
2250 IFESTHENRETURN
2260 IFACTHEN2240
2270 LV=A:IFLV=LI%(0,LI,0)THEN2300
2280 LI%(0,LI,0)=0:IFB$=CHR$(N+64)THENRETURN
2290 FORN1=0TO1:LI%(N1,LI,2)=999:LI%(N1,LI,1)=0:NEXT
2300 IFFNNUM(LV)THENGOSUB2400:GOTO2320
2310 GOSUB2600
2320 IFESTHEN2210
2330 LI%(0,LI,0)=LV:RETURN
2400 REM CNSTRNT INPT
2410 GOSUB6000:PRINT"■"LV$LI+1"■":PRINTTAB(15)"■"VA$(LV,0):LL=0:UL=999:F1=TR
2420 F2=TR:PRINTTAB(16)"■■■A■ MINIMUM":PRINTTAB(16)"■■B■ MAXIMUM□□
2430 IFF1THENLL=0
2440 IFF2THENUL=999
2450 PRINT"■"TAB(15)D$"□TYPE ■J■ FOR NO LIMIT":GOSUB4800
2460 PRINT"■"LEFT$(D$,7)TAB(22)"SELECT ";
2470 EX$="":MI$="A":MA$="B":LN=1:GOSUB5400:IFACTHEN2540
2480 IFESTHENRETURN
2490 EX$="N":MI$="0":MA$="9":IFB$="B"THEN2520
2500 PRINT"■"TAB(26)LEFT$(D$,10);:LN=3:GOSUB5400:IFB$="N"THENF1=TR:GOTO2430
2510 F1=FA:LL=VAL(B$):GOTO2460
2520 PRINT"■"TAB(26)LEFT$(D$,12);:LN=3:GOSUB5400:IFB$="N"THENF2=TR:GOTO2430
2530 F2=FA:UL=VAL(B$):GOTO2460
2540 IFNOT(F1ANDF2)THEN2560
2550 PRINT"■"TAB(16)LEFT$(D$,18)"■AT LEAST ONE LIMIT REQ'D":GOTO2460
```

```
2560 LI%(GR,LI,1)=LL:LI%(GR,LI,2)=UL:MI$="A":RETURN
2600 REM STNG CNSTRNT
2610 N1=0:FORN=1TO5:FL%(N)=0:NEXT:GOSUB6000
2620 PRINT"■"LV$LI+1"■":PRINTTAB(15)"■"VA$(LV,0):N1=0
2630 N=1:PRINT"■"LEFT$(D$,9)TAB(16);
2640 T$=VA$(LV,N):IFT$=""THEN2670
2650 PRINTTAB(16)"■■"CHR$(N+64)"■ ";:IFFL%(N)THENPRINT"■";
2660 PRINTT$:N=N+1:IFN<=5THEN2640
2670 PRINT"■"D$:GOSUB4800:MA$=CHR$(N+63)
2680 PRINT"■"LEFT$(D$,7)TAB(22)"SELECT ";:LN=1:GOSUB5400:IFESTHENRETURN
2690 IFACTHEN2720
2700 IFFL%(A)THENFL%(A)=FA:N1=N1-1:GOTO2630
2710 FL%(A)=TR:N1=N1+1:GOTO2630
2720 IFN1<N-1THEN2760
2730 PRINT"■"LEFT$(D$,20)TAB(16)"■BE SELECTIVE!
2740 PRINTTAB(16)"TO RE-INPUT CONSTRAINTS
2750 PRINTTAB(16)"PRESS ■RETURN■ ";:LN=0:GOSUB5200:GOTO2600
2760 FORN1=1TO5:LI%(GR,LI,N1)=0:NEXT
2770 F1=0:FORN=1TO5:LI%(GR,LI,N)=FL%(N):F1=F1 OR FL%(N):NEXT
2780 IFNOTF1THENLI%(GR,LI,2)=999
2790 RETURN
2800 REM DTA LST
2810 FORN=1TO8:FL%(N)=FA:NEXT:VC=0
2820 PS=TR:GOSUB6000
2830 PRINTLEFT$(D$,17):GOSUB4800
2840 PRINT"■■■":GOSUB4600
2850 N1=0:PRINT"■"TAB(15)"■DATA■ ■LISTING■   ■GROUP"GR+1
2860 PRINTTAB(15)"YOU MAY CHOOSE FROM 1 TO"R$TAB(15)"5 VARIABLES TO BE LISTED.
2870 PRINTTAB(15)"■■ONLY CASES SATISFYING"R$TAB(15)"■LIMITS WILL BE INCLUDED.■
2880 FORN=1TO8:PRINTTAB(15)"■■"CHR$(N+64)"■ ";:IFFL%(N)THENPRINT"■";
2890 PRINTVA$(N,0):NEXT:MA$=CHR$(72)
2900 PRINT"■"LEFT$(D$,5)TAB(17)"SELECT ";:LN=1:GOSUB5400:IFESTHEN2990
2910 IFNOTACTHEN2970
2920 IFVC<6THEN2950
2930 PRINT"■"LEFT$(D$,9)
2940 PRINTTAB(26)"■5 OR LESS"R$TAB(26)"■VARIABLES"R$TAB(26)"■PLEASE.":GOTO2900
2950 GOSUB3000:IFNOTMDTHEN2990
2960 GOTO2820
2970 IFFL%(A)THENFL%(A)=FA:VC=VC-1:GOTO2880
2980 FL%(A)=TR:VC=VC+1:GOTO2880
2990 RETURN
3000 REM DO LST
3010 RS=TR
3020 PS=TR:GOSUB6000:PRINT"■"TAB(15)"■DATA■ ■LISTING■    ■■";:IFGA=1THENPRINT
3030 IFGA=0THENPRINT"■GROUP■ ■"GR+1
3040 PRINTTAB(14);
3050 T$="■":FORN2=1TO8:IFNOTFL%(N2)THEN3110
3060 IFLEFT$(T$,1)="■"THENT$="■":GOTO3080
3070 T$="■"
3080 T$=T$+LEFT$(VA$(N2,0),5) .
3090 IFLEN(VA$(N2,0))<5THENT$=T$+LEFT$(SP$,5-LEN(VA$(N2,0)))
3100 PRINTT$;
3110 NEXT:PRINT:NL=0
3120 GOSUB300:IFESTHENRETURN
3130 NL=0:IFNOTMDTHENPRINTTAB(16)"■END OF DATA"
3140 PRINTTAB(16)RE$;:LN=0:GOSUB5400:IFESTHENRETURN
3150 IFNOTMDTHENRETURN
3160 GOTO3020
3200 REM STUP GRPH
3210 PS=TR:GOSUB6000:PRINT"■"TAB(31);:IFGA=0THENPRINT"■GROUP■ ■"1+GR
```

```
3220 X=6:Y=19:GOSUB6400:GOSUB7000
3230 FORAX=0TOGA:GOSUB700:GOSUB6600:IFESTHENRS=TR:RETURN
3240 GOSUB6800:NEXT:RS=TR:PRINT"■"D$TAB(16)PS$:ONGA+1GOSUB3600,800
3250 RETURN
3600 REM DO BAR GR
3610 FORN=1TO5:GR%(2,N)=TR:GR%(3,N)=TR:NEXT:GOSUB600:DP$(0)="▒":DP$(1)="■ ■
3620 GOSUB400:IFESTHENRETURN
3630 PRINT"■"TAB(16)D$RE$;:LN=0:GOSUB5400:RETURN
3800 REM 2-GRP BAR GR
3810 DG=TR:PS=TR:GOSUB6000:PRINT"■"TAB(30)"■GROUPS 1&2":X=6:Y=19:GOSUB6400
3820 GOSUB7000:AX=0:GOSUB700:GOSUB6600
3830 GOSUB6800:RS=TR:PRINT"■"D$TAB(16)PS$:GOSUB3600:DG=FA
3840 RETURN
4000 REM GRPHCS
4010 PRINT"■■■"TAB(10);:FORN=1TO21:PRINT"_";:NEXT
4020 FORN=1TO20:PRINT"■ ▌▌";:IFN=10THENPRINT"■■■"TAB(10);
4030 NEXT:PRINT"■"LEFT$(D$,9)TAB(10)"└──■┌──── ────■──┘"
4040 FORN=1TO4:PRINTTAB(10):FORN1=1TO21:PRINT"■ ";:NEXT:PRINT:NEXT:PRINT
4050 FORN=1TO40:PRINT"┬■▌┴┐";:NEXT
4060 PRINT"■■■■■ ■PLANET"R$" UGIZE■■"R$" ■LIFE"R$" YES■■"R$"▌■ATMSPHR
4070 PRINT" M-TYPE"R$"■■■■"TAB(33)"■STATUS"R$TAB(33)"ORBIT■■"R$TAB(33)"■SPEED
4080 PRINTTAB(33)"IMPLSE■■"R$TAB(33)"■COND"R$TAB(33)"GREEN"R$R$R$"ORDERS ";
4090 PRINT"- SCIENCE OFFICER■"R$"OBTAIN ALL AVAILABLE INFORMATION ON
4100 PRINT"THE INHABITANTS OF UGIZE."R$"TO ACCESS SHIPS COMPUTER PRESS ■RETURN
4110 PRINT"■■■"TAB(10);:FORN=1TO21:IFRND(0)<.5THENPRINT"●";:GOTO4130
4120 PRINT"o";:IFA$=CHR$(3)THEN1050
4130 NEXT:GETA$:IFA$<>R$THEN4110
4140 PRINT"■■■THE LANDING PARTY HAS RETURNED THE"R$"FOLLOWING INFORMATION";
4150 PRINT" ABOUT THE"R$"UGIZIANS.■■
4160 FORN=1TO8:PRINTVA$(N,0),:NEXT:PRINTTAB(9)"■"RE$;:LN=0:GOSUB5200
4170 RETURN
4600 REM RESTART
4610 PRINTTAB(15)"■■TYPE SHIFT ■@■ TO RESTART";:RETURN
4800 REM ACCEPT
4810 PRINTTAB(15)"TYPE SHIFT ■&■ TO ACCEPT":RETURN
5000 REM 1 CHR
5010 AC=FA:ES=FA
5020 GETA$:IFA$<>""THENPRINT" ▌▌";:GOTO5050
5030 CT=CT+1:IFCT>8THENPRINTMID$(" ▒",CB,1)"▌▌";:CB=3-CB:CT=0
5040 GOTO5020
5050 IFA$=CHR$(3)THEN1050,END
5060 IFA$="▒"THENAC=TR
5070 IFA$="─"THENES=TR
5080 RETURN
5200 REM STRNG
5210 POKE158,0
5220 GOSUB5000:A=ASC(A$):IFESORACTHENRETURN
5230 IFB$=""ANDA=20THEN5220
5240 IFB$=""ANDLN=0ANDA=80THENRETURN
5250 IFB$=""ANDA=13THENRETURN .
5260 IFA=13THENPRINTA$;:RETURN
5270 IFA=20ANDLEN(B$)<2THENPRINT"▌▌ ▌▌";:B$="":GOTO5220
5280 IFA=20THENPRINT"▌▌ ▌▌";:B$=LEFT$(B$,LEN(B$)-1):GOTO5220
5290 IFA<32OR(A>127ANDA<161)THEN5220
5300 IFA$<MI$ORA$>MA$ANDA$<>EX$THEN5220
5310 IFLEN(B$)>=LNTHEN5220
5320 PRINTA$;:B$=B$+A$:GOTO5220
5400 REM NON-MT
5410 B$="":GOSUB5200:IFESORACTHENRETURN
5420 IFB$=""ANDLNTHEN5410
```

```
5430 IFLN=0ANDA=80THEN5460
5440 IFLN=0THENRETURN
5450 A=ASC(B$)-64:RETURN
5460 PRINT"                          "SP$SP$SP$SP$;:GOSUB8000:RETURN
6000 REM PAGE STUP
6010 PRINT"  SELECTED     |       "GA$R$"  VARIABLES   |"
6020 FORN=1TO22:PRINTTAB(13)"|":NEXT:IFPSTHENPS=FA:GOTO6040
6030 PRINT"   "TAB(15)"CHOICES AND CHANGES":IFGA=0THENPRINTTAB(18)"GROUP "GR+1
6040 PRINT"     LIMITS
6050 IFGA=0THENPRINT"GROUP1 GROUP2":PRINT"      "SPC(7)"    "
6060 PRINT" "LEFT$(D$,20)"  # CASES"
6070 PRINT"  ";:IFGA=0THENPRINTSPC(4);
6080 FORN=0TOGA:PRINTVA$(MV(N),0)TAB(7);:NEXT
6090 FORN1=0TO2:V1=LI%(0,N1,0):IFV1=0THEN6190
6100 PRINT" "LEFT$(D$,7+4*N1)TAB(4)VA$(V1,0)
6110 TA=0:FORN=0TO1-GA:IFFNNUM(V1)THEN6150
6120 FORN2=1TO5:V2=LI%(N,N1,N2):IFV2>=0THENNEXT:GOTO6170
6130 IFGA=1THENPRINTTAB(4);
6140 PRINTTAB(TA)VA$(V1,N2):NEXTN2:GOTO6170
6150 IFGA=1THENPRINTTAB(4);
6160 LL=LI%(N,N1,1):UL=LI%(N,N1,2):PRINTTAB(TA);:GOSUB6200
6170 IFGA=0ANDTA<>7THENPRINT" "LEFT$(D$,7+4*N1):TA=7
6180 NEXTN
6190 NEXTN1:PRINT"  "LEFT$(D$,5)TAB(15);:RETURN
6200 REM WRT LMTS
6210 IFLL=0ANDUL=999THENPRINT"MIN     TO     MAX ";:RETURN
6220 PRINTLL;SPC(4-LEN(STR$(LL)))"     TO     "UL;SPC(4-LEN(STR$(UL)));:RETURN
6400 REM X,Y AXS
6410 PRINT"  "TAB(13+X)LEFT$(D$,Y-18);
6420 IFGA=1THENFORN=1TO5:PRINT"     ";:NEXT:PRINT"";:GOTO6450
6430 PRINT"  ";:FORN=1TO5:PRINT"     ";:NEXT
6440 PRINT"";:FORN=1TO3:PRINT"     ";:NEXT:PRINTLEFT$(D$,16)"";
6450 FORN=1TO5:PRINT"     ";:NEXT:RETURN
6600 REM BIN SZS
6610 FORN=0TO5:BM%(AX,N)=0:NEXT
6620 IFNOTFNNUM(MV(AX))THENFORN=MITOMA:BM%(AX,N)=N:NEXT:BS=1:RETURN
6630 BS=(MA-MI+1)/5:R=BS:TB=R:GOSUB7400:BS=R:MI=INT(MI/BS)*BS
6640 FORN=0TO5:BM%(AX,N)=(BS*N+MIN)-1:NEXT:RETURN
6800 REM DTA ON SCRN
6810 N=1:PRINT" "LEFT$(D$,14)TAB(15);:A$="     "
6820 IFAX=0THENPRINT" "TAB(20)LEFT$(D$,17);:A$=" "
6830 IFFNNUM(MV(AX))THEN6910
6840 T1$=LEFT$(VA$(MV(AX),BM%(AX,N)),4)
6850 IFLEN(T1$)<4THENT1$=T1$+LEFT$(SP$,4-LEN(T1$))
6860 PRINTT1$A$;
6870 IFA$=" "THENA$="":GOTO6890
6880 IFA$=""THENA$=" "
6890 IFN=5THEN6940
6892 IFBM%(AX,N+1)=0THEN6940
6900 N=N+1:GOTO6840
6910 PRINT"";:A$="  "+A$+" ":IFAX=0THENA$="   ":PRINT" ";
6920 UL=BM%(AX,N):LL=UL-BS+1:GOSUB6200
6930 PRINTA$;:IFN<5ANDBM%(AX,N)<>0THENN=N+1:GOTO6920
6940 IFAX=0THENPRINT" "LEFT$(D$,20)TAB(23)VA$(MV(AX),0):RETURN
6950 PRINT" "LEFT$(D$,9)TAB(14);
6960 FORN=1TOLEN(VA$(MV(AX),0)):PRINTMID$(VA$(MV(AX),0),N,1);" ";:NEXT:PRINT
6970 RETURN
7000 REM CLR
7010 FORN=0TO5:FORN1=0TO5:GR%(N,N1)=0:NEXT:NEXT:RETURN
7400 REM RND X
```

```
 7410 A$=STR$(INT(R)):T=VAL(MID$(A$,2,1)):IFT=1ORT=2ORT=5THEN7440
 7420 IFR<10THENR=R+1:GOTO7410
 7430 R=R+10↑(LEN(A$)-2):GOTO7410
 7440 IFR>10THENR=T*(10↑(LEN(A$)-2))
 7450 R=INT(R):IFTB>RTHEN7420
 7460 RETURN
 7600 REM VARS
 7610 DATA SEX,DEES,DEM,DOSE,END,AGE,#,HEIGHT,#,WEIGHT,#,KIDS,#,EYES,RED
 7620 DATA YELLOW,ORANGE,BLUE,END,HAIR,YELLOW,BROWN,GREY,BALD,END,FEET,#,FIN
 7800 REM TITLE
 7810 POKE59468,14:PRINT"■"TAB(10)"■┼┌●╲╲─ ¬↑┐└┘_¯_"VE"■■
 7815 PRINTTAB(4)"↑ PART OF THE ";
 7820 PRINT"¬↑|↑ ↑/↑└ ►╲● ╱NIT■"R$" BY THE ╲ATH ╱ETWORK ─URRICULUM ┬ROJECT■
 7830 PRINTTAB(16)"●─● ,■■■■■■■4.0 |↑●╲─■■"R$"     ╲F YOU HAVE A ─|╲ PRINTER,"
 7840 PRINT"YOU CAN GET HARDCOPY OF THE SCREEN AT
 7842 PRINTTAB(4)"ANY TIME BY PRESSING ■┌■.■■
 7850 PRINTTAB(8)RE$;:LN=0:GOSUB5200:RETURN
 8000 REM PRNT
 8010 OPEN6,4,6:PRINT#6,CHR$(24):OPEN1,4:PRINT#1:FORN=1TO25:FORN3=1TO40
 8020 GETA$:IFA$=CHR$(3)ORA$="─"THENN3=40:N=25:GOTO8060
 8030 A=PEEK(32727+40*N+N3):RF=A>127:A=A+128*(A>127):IFRFTHENPRINT#1,"■";
 8050 A=A-64*(A<32)-128*(A>63ANDA<128):PRINT#1,CHR$(A);:IFRFTHENPRINT#1,"■";
 8060 NEXT:PRINT#1:NEXT:PRINT#6,CHR$(36):CLOSE6:CLOSE1:RETURN
READY.
```

DATASEARCH 2.1

```
READY.

 5 REM DATASEARCH 2.1
 6 REM BY THE MATH NETWORK CURRICULUM PROJECT, SFSU, COPYRIGHT, 1981
 9 VERS=2.0
 10 GOTO1000
 100 REM CASE
 110 MD=TR:G1=FA:IFRSTHENPO=-1:RS=FA:P(0)=0:P(1)=0
 120 ES=FA:GETA$:ON-(A$=CHR$(3))-2*(A$="-")-3*(A$=" ")GOTO1050,240,260
 130 PO=PO+1:IFPO>NI-1THENMD=FA:GOTO250
 140 PRINT"■"D$"■■■■□"PO"■■  ":D=BE+PO*NV-1
 150 FORA=0TO-DG:GC=TR:IFDG=FAANDGR=1THENA=1
 160 FORN=0TO2:IFLI%(0,N,0)=0THEN210
 170 LI=LI%(0,N,0):DT=(PEEK(D+LI)):IFVA$(LI,2)<>""THEN200
 180 GC=DT>=LI%(A,N,1)ANDDT<=LI%(A,N,2):IFGCTHEN210
 190 N=2:GOTO210
 200 GC=LI%(A,N,DT)OR(LI%(A,N,2)=999):IFGC=0THENN=2
 210 NEXT:IFGC=0THEN230
 220 P(A)=P(A)+1:G1=TR:PRINT"■"D$TAB(-4*(GA=1)-8*A*(GA=0))P(A)
 230 NEXTA:ON-(G1-1)GOTO120,250
 240 ES=TR
 250 RETURN
 260 PRINT"■"D$TAB(16)RE$:GETA$:IFA$<>R$ANDA$<>"P"THEN260
 270 IFA$="P"THENPRINTTAB(16)"□  "SP$SP$SP$SP$:GOSUB8000
 280 PRINT"■"D$TAB(16)PS$"  ":GOTO130
 300 REM LIST
 310 NL=NL+1:GOSUB100:IFMD=FAORESTHEN370
 320 T=0:FORN2=1TONV:IFNOTFL%(N2)THEN360
 330 PRINT"■"TAB(14+5*T)LEFT$(D$,NL+1);:T=T+1
 340 IFFNNUM(N2)THENPRINTPEEK(D+N2);:GOTO360
 350 PRINTLEFT$(VA$(N2,PEEK(D+N2)),4);
 360 NEXTN2:PRINT:IFNL<20THEN310
 370 RETURN
 400 REM BAR GR
 410 GOSUB100:IFMD=FAORESTHENGC(0)=0:GC(1)=0:RETURN
 420 FORG=0TO-DG:IFDG=FAANDGR=1THENG=1
 430 IFP(G)=(GC(G)THEN495
 440 GC(G)=P(G):B1=INT((PEEK(D+MV(0))-MI)/BS)+1:IFB1>50RB1<1THEN495
 450 GR%(G,B1)=GR%(G,B1)+1
 460 T=GR%(G,B1)-INT(GR%(G,B1)/Z)*Z:IFT<>1ANDZ<>1THEN495
 470 IFGR%(G+4,B1)>14THENGOSUB500:GOTO460
 480 PRINT"■"TAB(G+17+4*B1)LEFT$(D$,15-GR%(G+4,B1));
 485 IFGR%(G+2,B1)THENPRINTMID$("■■",G+1,1):GR%(G+2,B1)=FA:GOTO495
 490 GR%(G+4,B1)=GR%(G+4,B1)+1:PRINTDP$(G):GR%(G+2,B1)=TR
 495 NEXT:GOTO410
 500 REM SCALE
 510 Z=Z*2:FORN2=0TO1:FORN=1TO5:GR%(N2+4,N)=GR%(N2+4,N)/2:IFGR%(N2,N)=0THEN560
 520 PRINT"■"TAB(N2+17+4*N)LEFT$(D$,15-GR%(N2+4,N));
 530 GR%(2+N2,N)=FA:IFN2=0THENPRINT"■□■";:GOTO550
 540 PRINT"■□■";
 550 FORN1=1TO14-GR%(N2+4,N):PRINT" □■";:NEXT
 560 NEXT:NEXT:GOSUB600:RETURN
 600 REM NUM Y
 610 PRINT"■"TAB(14);LEFT$(D$,15);
 620 SR$="■■■■":N=0:T$="□■□■■■■■"
 630 FORN1=1TO7:PRINTNLEFT$(SR$,4-LEN(STR$(N)))T$;:N=N1*5*Z
 640 IFN1-INT(N1/2)*2>0 THENPRINT"■";
```

```
650 NEXT:RETURN
700 REM LMTS
710 IFMV(AX)<>0THEN740
720 PRINT"■"TAB(14)LEFT$(D$,20)"■MISSING MAIN VARIABLE■"
730 PRINTTAB(16)RE$;:LN=0:GOSUB5200:ES=TR:RETURN
740 IFNOTFNNUM(MV(AX))THENMA=5:MI=1:RETURN
750 MA=0:MI=999:RS=TR:PRINT"■"D$TAB(16)"ONE MOMENT PLEASE    "
760 FORN1=1TO20:GOSUB100:IFESTHENRETURN
765 IFNOTMDTHENN=20:GOTO790
770 IFMA<PEEK(D+MV(AX))THENMA=PEEK(D+MV(AX))
780 IFMI>PEEK(D+MV(AX))THENMI=PEEK(D+MV(AX))
790 NEXT:IFP(GR)<1THENPRINT"■"D$TAB(21)"■TRY NEW LIMITS":GOTO730
795 PRINT"■"D$"■"SP$SP$:PRINTSP$SP$"    ":RETURN
800 REM DO CRSTB
810 GOSUB100:ON-(MD=FA)-2*(ES=TR)GOTO860,870
815 B1=5:B2=5
820 FORN=1TO5:IFPEEK(D+MV(0))<=BM%(0,N)THENB1=N:N=5
830 NEXT:FORN=1TO5:IFPEEK(D+MV(1))<=BM%(1,N)THENB2=N:N=5
840 NEXT:GR%(B1,B2)=GR%(B1,B2)+1
850 PRINT"■■■"TAB(16+4*B1)LEFT$(D$,15-3*B2)GR%(B1,B2):GOTO810
860 PRINT"■"TAB(16)D$RE$;:LN=0:GOSUB5400
870 RETURN
1000 REM MAIN
1010 GOSUB7800TTL & INIT
1015 GOSUB9000
1020 GOSUB1400
1030 ONGA+1GOSUB1800,1600
1040 IFESTHEN1020
1050 PRINT"■":POKE59468,12
1060 PRINT"GOODBYE FROM DATASEARCH
1065 POKE48,0:POKE49,64:POKE52,0:POKE53,64
1070 POKE144,P:END
1200 REM INIT
1220 DIMGR%(5,5),BM%(1,5),LI%(1,2,5),VA$(MV,6),TY%(MV),S%(MV),P(1)
1225 DEFFNNUM(X)=(VA$(X,2)="")
1230 MV$="MAIN VARIABLE":D$="■■■
```

```
1800 REM BAR GR MENU
1810 GOSUB6000:PRINT"■A■ "MV$:PRINTTAB(15)"■B■ "LV$1R$TAB(15)"■C■ "LV$2
1820 PRINTTAB(15)"■D■ "LV$3R$TAB(15)"■E■ CHANGE GROUP NUMBER
1830 PRINTTAB(15)"■F■ DO DATA LIST"R$TAB(15)"■G■ DO "GA$
1840 PRINTTAB(15)"■H■ DOUBLE GROUP BAR GRAPH":GOSUB5600
1850 PRINT"■■■■"TAB(29)"SELECT  ■";
1860 MA$="H":LN=1:GOSUB5400:IFESTHENRETURN
1870 IFACTHEN1850
1880 ONAGOSUB1900,1910,1910,1910,1920,1930,1940,1950
1890 GOTO1800
1900 MV=0:GOSUB2000:RETURN
1910 LI=A-2:GOSUB2200:RETURN
1920 GR=1-GR:RETURN
1930 GOSUB2800:RETURN
1940 Z=1:GOSUB3200:RETURN
1950 Z=1:GOSUB3800:RETURN
2000 REM MAIN VAR
2010 GOSUB6000:PRINT"■"MV$"■  ";:IFGA=1THENPRINT"■■"MV+1;
2020 PRINT:FORN=1TONV:PRINTTAB(15)"■"CHR$(N+64)"■ "VA$(N,0):NEXT
2030 PRINT"■■■■■■"TAB(31)"SELECT ";:MA$=CHR$(72):LN=1:GOSUB5400:IFESTHENRETURN
2040 IFACTHEN2030
2050 MV(MV)=A:RETURN
2200 REM LMT VAR
2210 GOSUB6000:PRINT"■LIMIT VARIABLE"RIGHT$(STR$(LI+1),1)
2220 FORN=1TONV:PRINTTAB(15)"■"CHR$(N+64)"■ "VA$(N,0):NEXT
2230 PRINTTAB(15)"■"CHR$(N+64)"■ DELETE LIMIT VARIABLE"
2240 PRINT"■"LEFT$(D$,5)TAB(31)"SELECT ";:MA$=CHR$(N+64):LN=1:GOSUB5400
2250 IFESTHENRETURN
2260 IFACTHEN2240
2270 LV=A:IFLV=LI%(0,LI,0)THEN2300
2280 LI%(0,LI,0)=0:IFB$=CHR$(N+64)THENRETURN
2290 FORN1=0TO1:LI%(N1,LI,2)=999:LI%(N1,LI,1)=0:NEXT
2300 IFFNNUM(LV)THENGOSUB2400:GOTO2320
2310 GOSUB2600
2320 IFESTHEN2210
2330 LI%(0,LI,0)=LV:RETURN
2400 REM CNSTRNT INPT
2410 GOSUB6000:PRINT"■"LV$LI+1"■":PRINTTAB(15)"■"VA$(LV,0):LL=0:UL=999:F1=TR
2420 F2=TR:PRINTTAB(16)"■■■A■ MINIMUM":PRINTTAB(16)"■■B■ MAXIMUM□□
2430 IFF1THENLL=0
2440 IFF2THENUL=999
2450 PRINT"■"TAB(15)D$"□TYPE ■N■ FOR NO LIMIT":GOSUB5800
2460 PRINT"■"LEFT$(D$,7)TAB(22)"SELECT ";
2470 EX$="":MI$="A":MA$="B":LN=1:GOSUB5400:IFACTHEN2540
2480 IFESTHENRETURN
2490 EX$="N":MI$="0":MA$="9":IFB$="B"THEN2520
2500 PRINT"■"TAB(26)LEFT$(D$,10);:LN=3:GOSUB5400:IFB$="N"THENF1=TR:GOTO2430
2510 F1=FA:LL=VAL(B$):GOTO2460
2520 PRINT"■"TAB(26)LEFT$(D$,12);:LN=3:GOSUB5400:IFB$="N"THENF2=TR:GOTO2430
2530 F2=FA:UL=VAL(B$):GOTO2460
2540 IFNOT(F1ANDF2)THEN2560
2550 PRINT"■"TAB(16)LEFT$(D$,18)"■AT LEAST ONE LIMIT REQ'D":GOTO2460
2560 LI%(GR,LI,1)=LL:LI%(GR,LI,2)=UL:MI$="A":RETURN
2600 REM STNG CNSTRNT
2610 N1=0:FORN=1TO5:FL%(N)=0:NEXT:GOSUB6000
2620 PRINT"■"LV$LI+1"■":PRINTTAB(15)"■"VA$(LV,0):N1=0
2630 N=1:PRINT"■"LEFT$(D$,9)TAB(16);
2640 T$=VA$(LV,N):IFT$=""THEN2670
2650 PRINTTAB(16)"■■"CHR$(N+64)"■ ";:IFFL%(N)THENPRINT"■";
2660 PRINTT$:N=N+1:IFN<=5THEN2640
```

```
2670 PRINT"■"D$:GOSUB5800:MA$=CHR$(N+63)
2680 PRINT"■"LEFT$(D$,7)TAB(22)"SELECT ";:LN=1:GOSUB5400:IFESTHENRETURN
2690 IFACTHEN2720
2700 IFFL%(A)THENFL%(A)=FA:N1=N1-1:GOTO2630
2710 FL%(A)=TR:N1=N1+1:GOTO2630
2720 IFN1<N-1THEN2760
2730 PRINT"■"LEFT$(D$,20)TAB(16)"■BE SELECTIVE!
2740 PRINTTAB(16)"TO RE-INPUT CONSTRAINTS
2750 PRINTTAB(16)"PRESS ■RETURN■ ";:LN=0:GOSUB5200:GOTO2600
2760 FORN1=1TO5:LI%(GR,LI,N1)=0:NEXT
2770 F1=0:FORN=1TO5:LI%(GR,LI,N)=FL%(N):F1=F1 OR FL%(N):NEXT
2780 IFNOTF1THENLI%(GR,LI,2)=999
2790 RETURN
2800 REM DTA LST
2810 FORN=1TONV:FL%(N)=FA:NEXT:VC=0
2820 PS=TR:GOSUB6000
2830 PRINTLEFT$(D$,17):GOSUB5800
2840 PRINT"■■■":GOSUB5600
2850 N1=0:PRINT"■"TAB(15)"■DATA■ ■LISTING■    ■GROUP"GR+1
2860 PRINTTAB(15)"YOU MAY CHOOSE FROM 1 TO"R$TAB(15)"5 VARIABLES TO BE LISTED.
2870 PRINTTAB(15)"■■ONLY CASES SATISFYING"R$TAB(15)"■LIMITS WILL BE INCLUDED.■
2880 FORN=1TONV:PRINTTAB(15)"■■"CHR$(N+64)"■ ";:IFFL%(N)THENPRINT"■";
2890 PRINTVA$(N,0):NEXT:MA$=CHR$(72)
2900 PRINT"■"LEFT$(D$,5)TAB(17)"SELECT ";:LN=1:GOSUB5400:IFESTHEN2990
2910 IFNOTACTHEN2970
2920 IFVC<6THEN2950
2930 PRINT"■"LEFT$(D$,9)
2940 PRINTTAB(26)"■5 OR LESS"R$TAB(26)"■VARIABLES"R$TAB(26)"■PLEASE.":GOTO2900
2950 GOSUB3000:IFNOTMDTHEN2990
2960 GOTO2820
2970 IFFL%(A)THENFL%(A)=FA:VC=VC-1:GOTO2880
2980 FL%(A)=TR:VC=VC+1:GOTO2880
2990 RETURN
3000 REM DO LST
3010 RS=TR
3020 PS=TR:GOSUB6000:PRINT"■"TAB(15)"■DATA■ ■LISTING■     ■■■";:IFGA=1THENPRINT
3030 IFGA=0THENPRINT"■GROUP■ ■"GR+1
3040 PRINTTAB(14);
3050 T$="■":FORN2=1TONV:IFNOTFL%(N2)THEN3110
3060 IFLEFT$(T$,1)="■"THENT$="■":GOTO3080
3070 T$="■"
3080 T$=T$+LEFT$(VA$(N2,0),5)
3090 IFLEN(VA$(N2,0))<5THENT$=T$+LEFT$(SP$,5-LEN(VA$(N2,0)))
3100 PRINTT$;
3110 NEXT:PRINT:NL=0
3120 GOSUB300:IFESTHENRETURN
3130 NL=0:IFNOTMDTHENPRINTTAB(16)"■END OF DATA"
3140 PRINTTAB(16)RE$;:LN=0:GOSUB5400:IFESTHENRETURN
3150 IFNOTMDTHENRETURN
3160 GOTO3020
3200 REM STUP GRPH
3210 PS=TR:GOSUB6000:PRINT"■"TAB(31);:IFGA=0THENPRINT"■GROUP■ ■"1+GR
3220 X=6:Y=19:GOSUB6400:GOSUB7000
3230 FORAX=0TOGA:GOSUB700:GOSUB6600:IFESTHENRS=TR:RETURN
3240 GOSUB6800:NEXT:RS=TR:PRINT"■"D$TAB(16)PS$:ONGA+1GOSUB3600,800
3250 RETURN
3600 REM DO BAR GR
3610 FORN=1TO5:GR%(2,N)=TR:GR%(3,N)=TR:NEXT:GOSUB600:DP$(0)="▒":DP$(1)="■ ■
3620 GOSUB400:IFESTHENRETURN
3630 PRINT"■"TAB(16)D$RE$;:LN=0:GOSUB5400:RETURN
```

```
3800 REM 2-GRP BAR GR
3810 DG=TR:PS=TR:GOSUB6000:PRINT"■"TAB(30)"■GROUPS 1&2":X=6:Y=19:GOSUB6400
3820 GOSUB7000:AX=0:GOSUB700:GOSUB6600
3830 GOSUB6800:RS=TR:PRINT"■"D$TAB(16)PS$:GOSUB3600:DG=FA
3840 RETURN
4000 REM SPCL INIT
4010 MD=0:N=0:B1=0:GR=0:T=0:Z=1:PO=0:RS=0:ES=0:TR=-1:FA=0:CB=1
4020 MM=1200:BE=16383-MM:H=INT(BE/256):L=BE-H*256:MV=20:NC=5:NV=8
4030 POKE52,L:POKE53,H:POKE48,L:POKE49,H
4040 R$=CHR$(13):RE$="■TO GO ON, PRESS RETURN■ "
4050 RETURN
5000 REM 1 CHR
5010 AC=FA:ES=FA
5020 GETA$:IFA$<>""THENPRINT" ■";:GOTO5050
5030 CT=CT+1:IFCT>8THENPRINTMID$(" ▒",CB,1)"■";:CB=3-CB:CT=0
5040 GOTO5020
5050 IFA$=CHR$(3)THEN1050,END
5060 IFA$="▒"THENAC=TR
5070 IFA$="←"THENES=TR
5080 RETURN
5200 REM STRNG
5210 POKE158,0
5220 GOSUB5000:A=ASC(A$):IFESORACTHENRETURN
5230 IFB$=""ANDA=20THEN5220
5240 IFB$=""ANDLN=0ANDA=80THENRETURN
5250 IFB$=""ANDA=13THENRETURN
5260 IFA=13THENPRINTA$;:RETURN
5270 IFA=20ANDLEN(B$)<2THENPRINT"■ ■";:B$="":GOTO5220
5280 IFA=20THENPRINT"■ ■";:B$=LEFT$(B$,LEN(B$)-1):GOTO5220
5290 IFA<32OR(A>127ANDA<161)THEN5220
5300 IFA$<MI$ORA$>MA$ANDA$<>EX$THEN5220
5310 IFLEN(B$)>=LNTHEN5220
5320 PRINTA$;:B$=B$+A$:GOTO5220
5400 REM NON-MT
5410 B$="":GOSUB5200:IFESORACTHENRETURN
5420 IFB$=""ANDLNTHEN5410
5430 IFLN=0ANDA=80THEN5460
5440 IFLN=0THENRETURN
5450 A=ASC(B$)-64:RETURN
5460 PRINT"■■■
```

```
6160 LL=LI%(N,N1,1):UL=LI%(N,N1,2):PRINTTAB(TA);:GOSUB6200
6170 IFGA=0ANDTA<>7THENPRINT"■"LEFT$(D$,7+4*N1):TA=7
6180 NEXTN
6190 NEXTN1:PRINT"■■"LEFT$(D$,5)TAB(15);:RETURN
6200 REM WRT LMTS
6210 IFLL=0ANDUL=999THENPRINT"MIN■■■TO■■■■MAX ";:RETURN
6220 PRINTLL;SPC(4-LEN(STR$(LL)))"■■■■TO■■■■■"UL;SPC(4-LEN(STR$(UL)));:RETURN
6400 REM X,Y AXS
6410 PRINT"■■"TAB(13+X)LEFT$(D$,Y-18);
6420 IFGA=1THENFORN=1TO5:PRINT"┬■■ ■■ ■■";:NEXT:PRINT"┐";:GOTO6450
6430 PRINT" ";:FORN=1TO5:PRINT"│ ■■ ■■ ■■";:NEXT
6440 PRINT"└";:FORN=1TO3:PRINT"■■ ■■┴■■ ■■ ■■┘";:NEXT:PRINTLEFT$(D$,16)"■┌";
6450 FORN=1TO5:PRINT"└──┘";:NEXT:RETURN
6600 REM BIN SZS
6610 FORN=0TO5:BM%(AX,N)=0:NEXT
6620 IFNOTFNNUM(MV(AX))THENFORN=MITOMA:BM%(AX,N)=N:NEXT:BS=1:RETURN
6630 BS=(MA-MI+1)/5:R=BS:TB=R:GOSUB7400:BS=R:MI=INT(MI/BS)*BS
6640 FORN=0TO5:BM%(AX,N)=(BS*N+MIN)-1:NEXT:RETURN
6800 REM DTA ON SCRN
6810 N=1:PRINT"■"LEFT$(D$,14)TAB(15);:A$="■■■■■■■"
6820 IFAX=0THENPRINT"■"TAB(20)LEFT$(D$,17);:A$="■"
6830 IFFNNUM(MV(AX))THEN6910
6840 T1$=LEFT$(VA$(MV(AX),BM%(AX,N)),4)
6850 IFLEN(T1$)<4THENT1$=T1$+LEFT$(SP$,4-LEN(T1$))
6860 PRINTT1$A$;
6870 IFA$="■"THENA$="┐":GOTO6890
6880 IFA$="┐"THENA$="■"
6890 IFN=5THEN6940
6892 IFBM%(AX,N+1)=0THEN6940
6900 N=N+1:GOTO6840
6910 PRINT"┐";:A$="■■"+A$+"■■":IFAX=0THENA$="■■■■":PRINT"■";
6920 UL=BM%(AX,N):LL=UL-BS+1:GOSUB6200
6930 PRINTA$;:IFN<5ANDBM%(AX,N)<>0THENN=N+1:GOTO6920
6940 IFAX=0THENPRINT"■■"LEFT$(D$,20)TAB(23)VA$(MV(AX),0):RETURN
6950 PRINT"■■"LEFT$(D$,9)TAB(14);
6960 FORN=1TOLEN(VA$(MV(AX),0)):PRINTMID$(VA$(MV(AX),0),N,1);"■■";:NEXT:PRINT
6970 RETURN
7000 REM CLR
7010 FORN=0TO5:FORN1=0TO5:GR%(N,N1)=0:NEXT:NEXT:RETURN
7400 REM RND X
7410 A$=STR$(INT(R)):T=VAL(MID$(A$,2,1)):IFT=1ORT=2ORT=5THEN7440
7420 IFR<10THENR=R+1:GOTO7410
7430 R=R+10↑(LEN(A$)-2):GOTO7410
7440 IFR>10THENR=T*(10↑(LEN(A$)-2))
7450 R=INT(R):IFTB>RTHEN7420
7460 RETURN
7800 REM TITLE
7810 GOSUB4000 SPCL INIT
7820 PRINT"┐"CHR$(142);
7830 POKE59468,14:PRINTTAB(12)"■┬■┤■ ■┬■_┤"VE"■■"R$TAB(4)"■ PART OF THE ";
7840 PRINT"┬■┤■ ■/■└ ■╲● ,NIT■"R$" BY THE ╲ATH /ETWORK ┴URRICULUM ┐ROJECT■
7850 PRINTTAB(16)"●_● /■■■■■■■4.0 ┤■●╲┴■■"R$"     ╲F YOU HAVE A ┴┤╲ PRINTER,"
7860 PRINT" YOU CAN GET HARDCOPY OF THE SCREEN AT
7865 PRINTTAB(4)"AT ANY TIME BY PRESSING ■┌■.■■
7870 GOSUB1200
7880 PRINTTAB(8)RE$;:LN=0:GOSUB5200:RETURN
8000 REM PRNT
8010 OPEN6,4,6:PRINT#6,CHR$(24):OPEN1,4:PRINT#1:FORN=1TO25:FORN3=1TO40
8020 GETA$:IFA$=CHR$(3)ORA$="─"THENN3=40:N=25:GOTO8060
8030 A=PEEK(32727+40*N+N3):RF=A>127:A=A+128*(A>127):IFRFTHENPRINT#1,"■";
```

```
8050 A=A-64*(A<32)-128*(A>63ANDA<128):PRINT#1,CHR$(A);:IFRFTHENPRINT#1,"■";
8060 NEXT:PRINT#1:NEXT:PRINT#6,CHR$(36):CLOSE6:CLOSE1:RETURN
9000 REM-LOAD DATA
9010 IFDPTHENRETURN
9020 PRINT"■■ ■OU MUST LOAD SOME DATA BEFORE WE BEGIN■
9025 POKE144,P
9030 GOSUB10200
9040 GOSUB9400
9050 GOSUB9600
9060 CLOSE1
9065 POKE144,P+3
9070 DP=TR:NV=NS
9080 RETURN
9200 REM-GET FLNM
9210 PRINT:PRINT"■NAME OF DATA FILE: ";
9220 MI$=" ":MA$=CHR$(255):B$="":LN=16:GOSUB5200:F$=B$
9230 RETURN
9400 REM-NN,NI,VA$,TY%
9405 PRINT"LOADING VARIABLES";
9410 INPUT#1,NN:INPUT#1,NI
9415 FORV=1TONN
9420 INPUT#1,VA$(V,0)
9425 INPUT#1,TY%(V)
9430 IFTY%(V)<0THEN9445
9435 FORI=1TOTY%(V)
9440 INPUT#1,VA$(V,I):NEXTI
9445 PRINT".";:NEXTV
9447 PRINT"■"
9450 IFCH$="T"THENPRINT"■■ON'T PRESS STOP ON TAPE!!!
9455 NS=0:PRINT"■CHOOSE AT MOST"NV"BY LETTER
9460 FORV=1TONN:PRINTTAB(5)CHR$(64+V)". "VA$(V,0):NEXT
9465 PRINT"■YPE SHIFT & WHEN DONE
9475 PRINT"YOUR CHOICE: ";
9480 LN=1:MI$="A":MA$=CHR$(NN+64):GOSUB5400:IFACANDNS>0THENGOSUB9800:RETURN
9485 CH=ASC(B$)-64
9490 PRINT"■"LEFT$(D$,CH+1)TAB(8);
9495 IFS%(CH)THENS%(CH)=FA:NS=NS-1:GOTO9510
9500 IFNS>=NVTHEN9515
9505 S%(CH)=TR:PRINT"■";:NS=NS+1
9510 PRINTVA$(CH,0)
9515 PRINT"■"LEFT$(D$,NN+3);:GOTO9475
9600 REM-RD DTA
9610 PRINT"■"LEFT$(D$,12)"■EADING ■ATA■";
9620 FORC=0TONI-1
9630 S=-1
9640 FOR V=1TONN
9650 INPUT#1,D:IFTY%(V)>0THEND=D+1
9660 IFNOTS%(V)THEN9690
9670 S=S+1:POKEBE+C*NS+S,D
9680 PRINT".";
9690 NEXTV,C
9700 RETURN
9800 REM CMPCT CHCS
9810 V=1:S=0
9820 IFNOTS%(V)THEN9850
9830 S=S+1:IFS=VTHEN9850
9840 FORI=0TONC:VA$(S,I)=VA$(V,I):NEXT
9850 V=V+1:IFV<=NNTHEN9820
9855 IFS+1<=MVTHENFORI=S+1TOMV:FORJ=0TONC:VA$(I,J)="":NEXTJ,I
9860 RETURN
```

```
10000 REM-POSTN TAPE
10010 PRINT"■EMOVE PROGRAM TAPE AND REPLACE IT WITH   YOUR DATA TAPE: "
10020 PRINT"■RESS RETURN WHEN READY: ";
10030 LN=0:GOSUB5200
10040 RETURN
10200 REM-DTA SRCE CHOICE
10210 PRINT"■OAD DATA FROM ■T■APE OR ■D■ISK? ";:LN=1:MI$="D":MA$="T":GOSUB5200
10220 IFB$<>"T"ANDB$<>"D"THEN10210
10225 CH$=B$
10230 IFB$="T"THENGOSUB10400
10240 IFB$="D"THENGOSUB10600
10250 RETURN
10400 REM-OPEN TAPE
10405 GOSUB10000
10410 PRINT"■■OR NEXT FILE ON TAPE, JUST PRESS <RET>
10420 GOSUB9200
10430 PRINT:IFF$<>""THENPRINT"●EARCHING FOR ■"F$
10440 OPEN1,1,0,F$:PRINT"■OUND ■"F$
10450 RETURN
10600 REM-DISK OPEN
10610 GOSUB9200:IFESTHENRETURN
10620 IFF$=""THENPRINT"|YPE NAME OF DISK FILE":GOTO10610
10630 PRINT"●EARCHING FOR ■"F$:DOPEN#1,(F$)
10640 IFDS<>0THENPRINTDS$:END
10650 PRINT"■OUND ■"F$
10660 RETURN
READY.
```

DTAMKR 2.0 DCAT

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READY.

 10 SYS1039:RUN
READY.


READY.

 1 GOTO1000
 200 REM-NET IN-
 210 I$="":D1$="R":
 220 GOSUB400:IF(PEEK(SQ)ANDRF)<>1THEN220
 230 SYSRX:A$=CHR$(PEEK(RB)):IFA$=RT$THENPRINT"■ ■";:SYSSD:RETURN
 240 I$=I$+A$:GOTO220
 400 REM-BLINK-
 410 IFDTHENPRINT"■"D1$"■";:D=FA:RETURN
 420 PRINT"■"D1$"■";:D=TR:RETURN
 600 REM-NET OUT-
 610 SYSBS:D1$="S":FORI=1TOLEN(O$):GOSUB400:POKEXB,ASC(MID$(O$,I,1)):SYSTX:NEXT
 620 POKEXB,13:SYSTX:PRINT"■ ■";:GOTO200
 1000 REM-MAIN-
 1010 GOSUB1200
 1020 GOSUB2000
 1030 ONCHOICEGOSUB3000,12600,13000,11000,6400,7000,9000,10000
 1070 GOTO1020
 1200 REM-INIT-
 1212 BL$="                                                    "
 1220 AC$="▒":ES$="—":RT$=CHR$(13)
 1225 R$="PRESS RETURN TO GO ON ":SC$="■HOLD DOWN SHIFT AND TYPE & WHEN DONE
 1227 SV$="■PLEASE POSITION DATA TAPE
 1230 MI=600:MV=20:MD=4:NC=5:VC=4:VM=222
 1240 TR=-1:FA=0:KB=158
 1250 DIMDT%(MI),TY%(MV),VA$(MV),DN$(MV,MD)
 1260 DP=FA:SV=TR:PR=FA
 1300 GOSUB1400
 1310 GOSUB1600
 1320 E1$="■VALUE OUT OF BOUNDS"
 1321 E2$="■NET ERROR"
 1322 E3$="■NO MORE ROOM"
 1323 E4$="■NO MORE ROOM FOR VARIABLES"
 1330 BS=1048:SQ=BS+15:RB=BS+17:XB=BS+18:TX=BS+9:RX=BS+6:RF=1:SD=BS+3
 1340 OF=33
 1390 RETURN
 1400 REM-FNCTNS-
 1410 DEFFNDI(CV)=(TY%(CV)>0)
 1420 DEFFNVA(X)=DT%(CI*NV+CV)
 1430 DEFFND(I)=ASC(MID$(I$,I+8))-OF
 1590 RETURN
 1600 REM-INITDTA-
 1605 PRINT:PRINT"■PLEASE WAIT A MOMENT...
 1610 FORI=0TOMI:DT%(I)=-1:NEXT
 1612 FORI=0TOMV:TY%(I)=0:VA$(I)="":NEXT
 1614 FORI=0TOMV:FORJ=0TOMD:DN$(I,J)="":NEXT
 1620 NI=0:NV=0:CI=0:CV=0:DP=FA:SV=TR:PR=FA
 1690 RETURN
 2000 REM-CHOICES
```

```
2010 PRINT"■       ■DATA MAKER
2015 PRINT"THIS PROGRAM ALLOWS YOU TO CREATE DATA
2016 PRINT"TO BE STORED ON TAPE,DISK OR NETWORK TO
2017 PRINT"BE USED WITH DATA SEARCH.
2020 PRINT"■YOUR CHOICES ARE:
2030 T=5
2040 PRINTTAB(T)"■■A■. LOAD NEW DATA
2050 PRINTTAB(T)"■■B■. SEE NET NAMES OF DATA
2060 PRINTTAB(T)"■■C■. DELETE DATA FROM NETWORK
2062 PRINTTAB(T)"■■D■. QUIT
2065 IFNOTDPTHEN2110
2070 PRINTTAB(T)"■■E■. LIST DATA
2080 PRINTTAB(T)"■■F■. EDIT OR APPEND DATA
2085 PRINTTAB(T)"■■G■. SAVE DATA
2090 PRINTTAB(T)"■■H■. CLEAR DATA
2110 PRINT"■YOUR CHOICE: ";
2130 IFNOTDPTHENL1$="A":L2$="D"
2140 IFDPTHENL1$="A":L2$="H"
2150 B$="":LS=1:GOSUB8400
2155 IFRE$=ES$THEN2000
2160 CH=ASC(B$)-64
2190 RETURN
2200 REM-FRM KBD-
2210 IFDPTHENGOSUB2800:GOTO2390
2220 PRINT"■   ■GETTING VARIABLES
2225 PRINTSC$
2230 GOSUB3200
2232 IFRE$=ES$THENRETURN
2235 IFRE$=AC$THEN2380
2240 IFNV=MVTHENPRINTE4$:GOSUB15000:GOTO2380
2250 GOTO2230
2380 IFRETHENGOSUB3600
2390 RETURN
2400 REM-TAPELOAD-
2405 PRINTSV$:PRINT:PRINT"REMINDER: WHEN GIVING TAPE FILE NAME,
2406 PRINT"FIRST FEW LETTERS ARE ENOUGH, OR
2407 PRINT"JUST HIT RETURN FOR NEXT FILE ON TAPE.
2410 GOSUB9600
2415 IFRE$=ES$THENRETURN
2420 PRINT"SEARCHING FOR "F$:OPEN1,1,0,F$
2430 GOSUB2600
2440 RETURN
2500 REM-DISK LOAD-
2510 PRINT"DRIVE NUMBER: ";:B$=STR$(DR):L1$="0":L2$="1":LS=2:GOSUB8400
2515 DR=VAL(B$)
2520 IFRE$=ES$THENRETURN
2530 GOSUB9600:IFRE$=ES$THENRETURN
2540 PRINT"SEARCHING FOR "F$:DOPEN#1,(F$),D(DR)
2550 IFDS<>0THENPRINTDS$:DCLOSE:GOSUB15000:RETURN
2560 GOSUB2600
2570 RETURN
2600 REM--LOAD FILE 1-
2605 IFDPTHENGOSUB10000
2610 PRINT"FOUND ■"F$;:INPUT#1,NV
2620 INPUT#1,NI
2630 FORCV=0TONV-1
2640 INPUT#1,VA$(CV)
2650 INPUT#1,TY%(CV)
2660 IFTY%(CV)<0THEN2690
2670 FORI=0TOTY%(CV)-1
```

```
2680 INPUT#1,DN$(CV,I):NEXTI
2690 PRINT".";:NEXTCV
2700 PRINT:PRINT"LOADING DATA";
2710 FORI=0TONI*NV-1
2720 INPUT#1,DT%(I)
2730 PRINT".";
2740 NEXTI
2750 CLOSE1:DP=TR
2760 PRINT:PRINT"FINISHED DATA LOAD":GOSUB15000
2770 RETURN
2800 REM--LOAD KBD,DP=TR
2810 PRINT:PRINT"CHOICES ARE:
2820 T=5:PRINTTAB(T)"A. APPEND NEW DATA
2830 PRINTTAB(T)"B. ADD A NEW VARIABLE
2840 PRINT"YOUR CHOICE: ";
2850 LS=1:L1$="A":L2$="B":B$="":GOSUB8400
2870 IFRE$=ES$ORRE$=AC$THENRETURN
2880 IFB$="A"THENGOSUB3600:RETURN
2890 GOSUB3200
2900 IFRE$=ES$THENRETURN
2910 GOSUB5200
2920 CV=NV-1
2930 FORCI=0TONI-1
2935 PRINT"CASE"CI+1;": ";
2940 GOSUB5600:IFRE$=ES$THENGOSUB5400:CI=NI-1
2950 NEXTCI
2990 RETURN
3000 REM-NEW DTA-
3010 PRINT"     LOAD NEW DATA
3015 T=5
3020 PRINTTAB(T)"A. FROM KEYBOARD
3030 PRINTTAB(T)"B. FROM TAPE
3035 PRINTTAB(T)"C. FROM DISK
3040 PRINTTAB(T)"D. FROM NETWORK
3050 PRINT"YOUR CHOICE: ";
3060 B$="":LS=2:L1$="A":L2$="D":GOSUB8400
3065 IFRES$=ES$THEN3190
3070 CH=ASC(B$)-64
3080 ONCHGOSUB2200,2400,2500,12000
3190 RETURN
3200 REM-VARS-
3205 RE=FA
3220 PRINT:PRINT"VARIABLE"NV+1"NAME: ";
3230 B$=VA$(NV):LS=NC:L1$="":L2$="":GOSUB8400
3240 IFRE$=ES$THENRETURN
3245 IFRE$=AC$THENRE=TR:RETURN
3250 VA$(NV)=B$
3260 PRINT"N.UMERIC OR D.ISCRETE? ";
3262 B$="":IFTY%(NV)=0THEN3270
3264 B$="N":IFFNDI(NV)THENB$="D"
3270 LS=1:GOSUB8400:IFRES$=ES$THENPRINT:GOTO3220
3275 IFRE$=AC$THENRETURN
3280 IFB$<>"N"ANDB$<>"D"THEN3260
3290 IFB$<>"D"THEN3350
3300 GOSUB3400
3310 IFRE$=ES$THEN3260
3320 GOTO3380
3350 TY%(NV)=-1
3380 RE=TR:DP=TR:SV=FA:NV=NV+1
3390 RETURN
```

```
3400 REM-DISC-
3405 PRINTSC$
3410 TB=5:N=0
3420 PRINTTAB(TB)"VALUE"N+1"; ";
3430 B$=DN$(NV,N):LS=VC:L1$="":L2$="":GOSUB8400
3440 IFRE$=ES$ANDN=0THENRETURN
3450 IFRE$=ES$THENN=N-1:PRINT:GOTO3420
3460 IFRE$=AC$ANDN=0THENRE$=ES$:RETURN
3480 IFRE$=AC$THEN3570
3485 GOSUB8600:IFNOTRETHEN3420
3490 DN$(NV,N)=B$
3492 IFN<MDTHEN3500
3494 N=N+1:PRINT"■THAT'S AS MANY AS ALLOWED
3496 GOSUB15000:GOTO3570
3500 N=N+1:GOTO3420
3570 RE$="":TV%(NV)=N
3590 RETURN
3600 REM-CASES-
3605 PRINT:PRINT"■ADDING CASES
3607 PRINTSC$
3610 CI=NI
3620 GOSUB3800
3630 IFRE$=ES$THENRETURN
3640 NI=NI+1
3650 IFRE$=AC$THENRETURN
3660 GOTO3610
3800 REM-CASE CI-
3805 IFCI>=INT(MI/NV)THENPRINTE3$:GOSUB15000:RETURN
3810 CV=0
3820 PRINT"CASE NUMBER"CI+1
3830 GOSUB5600
3910 IFRE$=AC$ORRE$=ES$THENRETURN
3920 IFCV=NV-1THENRETURN
3930 CV=CV+1:GOTO3830
4000 REM-DISC CASE CI,CV-
4010 GOSUB4600:B$=VS$
4020 LS=VC:L1$="":L2$="":GOSUB8400
4030 IFRE$=ES$THENRETURN
4040 IFRE$=AC$AND(CV<NV-1 OR B$="")THENRE$=ES$:RETURN
4045 GOSUB8600:IFNOTRETHEN4060
4050 GOSUB4400
4060 IFNOTRETHENPRINT"MUST BE ONE OF ";:GOSUB5000:GOTO5630
4070 RETURN
4200 REM-NUM B$
4210 VN=VAL(B$)
4220 RE=TR:IFVN<0ORVN>VMTHENRE=FA:RETURN
4230 DT%(CI*NV+CV)=VN
4240 RETURN
4400 REM-STRNG B$-
4410 GOSUB4800
4420 IFNOTRETHENRETURN
4430 DT%(CI*NV+CV)=VN
4440 RETURN
4600 REM-CI,CV-
4610 RE=FA:VS$="":VN=FN VA(0)
4620 IFVN<0THENRETURN
4630 RE=TR
4640 IFFN DI(CV)THENVS$=DN$(CV,VN):RETURN
4650 VS$=STR$(VN)
4660 RETURN
```

```
4800 REM-LKP B$
4810 RE=FA
4820 FORI=0TOMD
4830 IFDN$(CV,I)=B$THENVN=I:RE=TR
4840 NEXT
4850 RETURN
5000 REM-CV-
5010 IFTY%(CV)<1THENRETURN
5020 PRINT"(";
5030 FORI=0TOTY%(CV)-1
5040 PRINTDN$(CV,I)",";
5050 NEXT
5060 PRINT"■)"
5090 RETURN
5200 REM-MAKE RM-
5210 PRINT"■MAKING ROOM FOR NEW VARIABLE";
5220 FORI=NI-1TO0STEP-1
5230 FORJ=NV-2TO0STEP-1
5240 DT%(I*NV+J)=DT%(I*(NV-1)+J)
5250 PRINT".";
5260 NEXTJ
5265 DT%(I*NV+NV-1)=-1
5270 NEXTI
5280 PRINT
5290 RETURN
5400 REM-RMVE LST VAR-
5410 PRINT"■REMOVING LAST VARIABLE";
5420 FORI=0TONI-1:FORJ=0TONV-2
5440 DT%(I*(NV-1)+J)=DT%(I*NV+J)
5450 PRINT".";
5460 NEXTJ,I
5480 PRINT
5490 NV=NV-1
5590 RETURN
5600 REM-CI,CV-
5630 TB=5:PRINTTAB(TB)VA$(CV)": ";
5640 IFFNDI(CV)THENGOTO4000
5655 B$="":IF FN VA(CV)>=0THENB$=STR$(FN VA(CV))
5660 LS=3:L1$="0":L2$="9":GOSUB8400
5670 IFRE$=ES$THENRETURN
5690 IFRE$=AC$AND(CV<NV-1ORB$="")THENRE$=ES$:RETURN
5700 GOSUB4200
5705 IFNOTRETHENPRINTE1$:GOTO5630
5790 RETURN
6400 REM-LIST
6410 PRINT:PRINT"    ■LIST DATA
6420 PRINT"ON ■SCREEN OR ■PRINTER: ";
6430 LS=1:L1$="":L2$="":B$="":GOSUB8400
6440 IFRE$=ES$THENRETURN
6450 IFB$<>"S"ANDB$<>"P"THEN6420
6460 PR=FA:IFB$="P"THENPR=TR
6470 IFNOTPRTHEN6500
6472 PRINT"IS YOUR PRINTER CONNECTED? ";:LS=1:L1$="N":L2$="Y":B$="":GOSUB8400
6474 IFB$<>"Y"THENRETURN
6480 PRINT"HOW MANY COLUMNS ON PRINTER? "; :LS=3:L1$="0":L2$="9":B$=""
6485 GOSUB8400:IFRE$=ES$THENRETURN
6490 CO=VAL(B$)
6495 OPEN128,4:CMD128
6500 PRINT:PRINT"    DATA LISTING
6510 GOSUB6600:IFRE$=ES$THEN6525
```

```
6520 GOSUB6800
6525 IFPRTHENPR=FA:GETA$:CLOSE128
6530 PRINT:GOSUB15000
6590 RETURN
6600 REM-VARS-
6610 FORCV=0TONV-1
6620 PRINTVA$(CV)": ";
6630 IFNOTFNDI(CV)THENPRINT"NUMERIC":GOTO6690
6650 GOSUB5000
6690 IFPEEK(KB)<>0THENPOKEKB,0:RE$=ES$:RETURN
6700 NEXT
6710 RETURN
6800 REM-CASES-
6805 C=0:L=NV+3+INT((NV+1)/6)
6810 PRINT:PRINT"CASE   ";
6820 FORCV=0TONV-1
6825 IFNOTPRTHENIFCV/2=INT(CV/2)THENPRINT"■";
6830 PRINTVA$(CV)LEFT$(BL$,NC+1-LEN(VA$(CV)));
6831 IFNOTPRTHENPRINT"■";
6832 C=C+VC+1
6835 IFPRAND(C+VC+1>CO)AND(CV<>NV-1)THENPRINT:C=0
6840 NEXTCV
6850 FORCI=0TONI-1
6855 PRINT:PRINTCI+1;LEFT$(BL$,NC-LEN(STR$(CI+1)));:C=VC+1
6860 FORCV=0TONV-1
6865 IFNOTPRTHENIFCV/2=INT(CV/2)THENPRINT"■";
6870 GOSUB4600:PRINTVS$LEFT$(BL$,NC+1-LEN(VS$));
6872 IFNOTPRTHENPRINT"■";
6875 C=C+VC+1
6880 IFPRAND(C+VC+1>CO)AND(CV<>NV-1)THENPRINT:C=0
6890 NEXT
6900 IFPEEK(KB)<>0THENPOKEKB,0:RE$=ES$:RETURN
6905 L=L+1+INT((NV+1)/6)
6907 IFNOTPRAND(L)24-INT((NV+1)/6))THENPRINT:GOSUB15000:L=0
6910 NEXT
6990 RETURN
7000 R■-EDIT
7005 PRINT"■       ■EDIT OR APPEND DATA
7010 PRINT"■THERE ARE■"NI"■CASES.
7020 PRINT"■AT WHAT CASE NUMBER TO START EDITING?
7030 PRINT"JUST HIT <RETURN> TO ADD NEW CASES: ";
7040 B$="":LS=3:L1$="0":L2$="9":GOSUB8200
7050 IFRE$=ES$THENRETURN
7060 IFB$=""THENCI=NI:GOTO7100
7070 CI=VAL(B$)-1:IFCI<0ORCI>NITHENCI=NI
7100 PRINT:GOSUB3800:IFRE$=AC$ORRE$=ES$THENRETURN
7110 CI=CI+1:IFCI>NITHENNI=CI
7120 GOTO7100
8000 REM-CHAR-
8010 T=TI:RE$=RT$
8020 IFTI<T+30THENPRINT"■■";:GOTO8050
8030 IFTI<T+60THENPRINT" ■";:GOTO8050
8040 T=TI
8050 GETA$:IFA$=""THEN8020
8055 IFA$=AC$THENRE$=AC$
8057 IFA$=ES$THENRES$=ESC$
8060 PRINT" ■";:RETURN
8200 REM-STRNG
8220 GOSUB8000:A=ASC(A$)
8240 IFB$=""ANDA=20THEN8220
```

```
8250 IFB$=""ANDA=13THENRETURN
8260 IFA=13THENPRINT:RETURN
8262 IFRE$=ES$THENPRINT:RETURN
8264 IFRE$=AC$THENPRINT:RETURN
8266 DI=TR
8270 IFA=20ANDLEN(B$)<2THENPRINTA$;:B$="":GOTO8220
8280 IFA=20THENPRINTA$;:B$=LEFT$(B$,LEN(B$)-1):GOTO8220
8290 IFA<32OR(A)127ANDA<161)THEN8220
8295 IFL1$<>""ANDA$<L1$THEN8220
8297 IFL2$<>""ANDA$>L2$THEN8220
8300 IFLEN(B$)>=LSTHEN8220
8320 PRINTA$;:B$=B$+A$
8325 IFA$=CHR$(34)THENPRINTCHR$(34)"■";
8340 GOTO 8220
8400 REM-NON-EMTY-
8410 DI=FA:PRINTB$;
8420 GOSUB8200
8422 IFRE$=ES$THENRETURN
8424 IFRE$=AC$THENRETURN
8430 IFB$=""ANDLS<>0THEN8420
8440 RETURN
8600 REM-NO SPCES B$-
8610 RE=FA
8620 IFLEN(B$)=0THENRETURN
8630 IFLEN(B$)=1ANDASC(B$)=32THENRETURN
8640 IFASC(B$)=32THENB$=MID$(B$,2):GOTO8620
8660 IFMID$(B$,LEN(B$))=" "THENB$=LEFT$(B$,LEN(B$)-1):GOTO8620
8680 RE=TR
8690 RETURN
9000 REM-SAVE DATA-
9010 PRINT"■    ■SAVE DATA
9020 T=5
9030 PRINTTAB(T)"■■A■. ON TAPE
9035 PRINTTAB(T)"■■B■. ON DISK
9040 PRINTTAB(T)"■■C■. ON NETWORK
9050 PRINT"■YOUR CHOICE: ";
9060 B$="":LS=2:L1$="A":L2$="C":GOSUB8400
9065 IFRE$=ES$THEN9190
9070 CH=ASC(B$)-64
9080 ONCHGOSUB9200,9300,12400
9190 RETURN
9200 REM-TPSVE-
9210 PRINTSV$:GOSUB9600
9220 IFRE$=ES$THENRETURN
9230 PRINT"SAVING ■"F$;:OPEN1,1,1,F$
9240 GOSUB9400
9250 RETURN
9300 REM-DSKSVE-
9310 PRINT"DRIVE NUMBER: ";:B$=STR$(DR):L1$="0":L2$="1":LS=1:GOSUB8400
9315 DR=VAL(B$)
9320 IFRE$=ES$THENRETURN
9330 GOSUB9600:IFRE$=ES$THENRETURN
9340 PRINT"SAVING AS "F$:DOPEN#1,(F$),W,D(DR)
9350 IFDS<>0THENPRINTDS$:DCLOSE:GOSUB15000:RETURN
9360 GOSUB9400
9370 RETURN
9400 REM-SVE FLE1
9410 PRINT#1,NV:PRINT#1,NI
9430 FOR CV=0TONV-1
9440 PRINT#1,VA$(CV)
```

```
9450 PRINT#1,TY%(C/)
9460 IFTY%(CV)<0THEN9490
9470 FORI=0TOTY%(CV)-1
9480 PRINT#1,DN$(CV,I):NEXTI
9490 PRINT".";:NEXTCV
9500 PRINT:PRINT"SAVING DATA";
9510 FORI=0TONI*NV-1
9520 PRINT#1,DT%(I)
9530 PRINT".";
9540 NEXT
9550 CLOSE1:SVD=TR
9560 PRINT:PRINT"FINISHED DATA SAVE":GOSUB15000
9570 RETURN
9600 REM-GET FLE NM--
9610 RE=TR:PRINT:PRINT"NAME OF DATA FILE: ";
9620 LS=16:L1$="":L2$="":B$=F$:PRINTF$;:GOSUB8200
9625 IFRE$=ES$THENRE=FA
9630 PRINT:F$=B$
9690 RETURN
10000 REM-CLR-
10010 IFSVTHEN10080
10020 PRINT"YOUR DATA IS NOT SAVED!
10030 PRINT"ARE YOU SURE YOU WANT TO CLEAR?
10040 PRINT"(Y OR N): ";
10050 LS=1:L1$="N":L2$="Y":B$="":GOSUB8400
10060 IFB$<>"Y"THENRETURN
10080 GOSUB1600
10090 RETURN
11000 REM-QUT
11010 IFSVTHEN11100
11020 PRINT:PRINT"WARNING! YOU HAVEN'T SAVED YOUR DATA!
11040 PRINT"ARE YOU SURE YOU WANT TO QUIT?
11050 PRINT"(Y OR N): ";
11060 LS=1:L1$="N":L2$="Y":B$="":GOSUB8400
11070 IFRE$=ES$ORB$<>"Y"THENRETURN
11100 PRINT:PRINT"GOODBYE FROM DATA MAKER
11105 POKE40,1:POKE41,4
11110 END
12000 REM-NT LD-
12010 GOSUB12800:IFNOTRETHENRETURN
12020 GOSUB9600:IFNOTRETHENRETURN
12030 O$="DDR"+F$:GOSUB600
12035 IFLEFT$(I$,4)<>"DDRT"THENPRINT:PRINT"NOT FOUND":GOTO12020
12040 GOSUB1600
12050 GOSUB14000:IFNOTRETHENRETURN
12060 GOSUB14200:IFNOTRETHENRETURN
12070 GOSUB14400:IFRETHENPRINT"F$" HAS BEEN LOADED
12075 GOSUB15000
12080 DP=TR:RETURN
12400 REM-NTSVE-
12410 PRINT"  SAVE DATA ON NETWORK
12415 GOSUB12800:IFNOTRETHENRETURN
12420 GOSUB9600
12430 IFNOTRETHENRETURN
12440 PRINT"YOUR NAME: ";
12450 LS=16:L1$="A":L2$="Z":B$="":GOSUB8400
12460 IFRE$=ES$THENRETURN
12470 GOSUB13200
12480 O$="DDA"+O$+B$+F$:GOSUB600
12490 IFLEFT$(I$,4)<>"DDAT"THENPRINTF$" IN USE":GOTO12420
```

```
12495 H$=MID$(I$,5)
12500 GOSUB13400:IFNOTRETHENRETURN
12510 GOSUB13600:IFNOTRETHENRETURN
12520 GOSUB13800
12530 IFRETHENPRINT"■"F$"■ HAS BEEN SAVED":SVD=TR
12540 GOSUB15000
12590 RETURN
12600 REM-NETNAMES-
12610 PRINT:PRINT"■LOOK AT NAMES OF DATA FILES ON NETWORK"
12620 GOSUB12800:IFNOTRETHENRETURN
12640 PRINT"TYPE FIRST FEW LETTERS OF NAMES
12650 PRINT"OR HIT <RET> TO SEE ALL: ";
12660 LS=16:L1$="":L2$="":B$="":GOSUB8200
12665 PRINT
12670 IFRE$=ES$ORRE$=AC$THENRETURN
12680 O$="DDN"+"000"+B$
12690 GOSUB600:IFMID$(I$,4,1)<>"T"THEN12790
12700 PRINTMID$(I$,8):GETA$:IFA$=ES$THEN12790
12710 O$="DDN"+MID$(I$,5,3)+B$:GOTO12690
12790 PRINT:GOSUB15000:RETURN
12800 REM-DIAL-
12805 RE=TR
12810 PRINT:PRINT"HAVE YOU DIALLED THE NETWORK? ";
12830 LS=1:L1$="N":L2$="Y":B$="":GOSUB8400
12840 IFRE$=ES$THENRE=FA:RETURN
12850 IFB$="Y"THENRETURN
12852 PRINT:PRINT"DO YOU HAVE A MODEM? ";:B$="":GOSUB8400
12854 IFRE$=ES$ORB$="N"THENRE=FA:RETURN
12860 PRINT"■PLEASE DIAL 469-2125 ";
12870 O$="HELLO FROM DATAMAKER":GOSUB600:PRINT:PRINTI$:RETURN
13000 REM-NETDELETE-
13010 GOSUB12800
13020 IFNOTRETHENRETURN
13030 PRINT:PRINT"     ■DELETE DATA FROM NETWORK
13040 GOSUB9600
13050 IFNOTRETHENRETURN
13060 PRINT"YOUR NAME: ";
13070 LS=16:L1$="A":L2$="Z":B$="":GOSUB8400
13080 IFRE$=ES$THENRETURN
13090 GOSUB13200
13100 O$="DDD"+O$+B$+F$:GOSUB600
13110 A$=MID$(I$,4,1):IFA$="C"THENPRINT"WRONG NAME AS CREATOR OF "F$:GOTO13060
13120 IFA$="F"THENPRINT:PRINT"NO DATA FILE BY THAT NAME":GOTO13040
13130 IFI$="DDDT"THENPRINT:PRINT"SUCCESSFUL DELETE OF "F$
13140 PRINT:GOSUB15000
13150 RETURN
13200 REM-FRMT O$-
13210 O$=MID$(STR$(LEN(B$)),2):IFLEN(O$)<2THENO$="0"+O$
13220 RETURN
13400 REM-SAVE HDR-
13410 RE=FA
13420 O$="DDL"+H$+CHR$(OF+NV)+CHR$(OF+NI)
13430 FORI=0TONV-1:O$=O$+CHR$(OF+TY%(I)):NEXT
13440 GOSUB600:IFLEFT$(I$,4)<>"DDLT"THENPRINTE2$:RETURN
13450 V=0:LS=40-NC
13460 O$="DDL"+H$:L=0
13470 A$=VA$(V)
13480 IFLEN(A$)<NCTHENA$=A$+" ":GOTO13480
13490 O$=O$+A$:L=L+NC:V=V+1
13500 IFL<LSANDV<NVTHEN13470
```

```
13510 GOSUB600:IFLEFT$(I$,4)<>"DDLT"THENPRINTE2$:RETURN
13520 IFV<NVTHEN13460
13530 RE=TR:RETURN
13600 REM-SAVE DISC-
13610 RE=FA:V=0:LS=40-VC:C=0
13620 O$="DDL"+H$:L=0
13630 IFTY%(V)<0THEN13700
13640 A$=DN$(V,C)
13650 IFLEN(A$)<VCTHENA$=A$+" ":GOTO13650
13660 O$=O$+A$:L=L+VC:C=C+1
13670 IFL<LSANDC<TY%(V)THEN13640
13680 IFL>=LSTHENGOSUB600:IFLEFT$(I$,4)<>"DDLT"THENPRINTE2$:RETURN
13690 IFC<TY%(V)THEN13620
13700 V=V+1:IFV<NVTHENC=0:GOTO13630
13710 IFL>0THENGOSUB600:IFLEFT$(I$,4)<>"DDLT"THENPRINTE2$:RETURN
13790 RE=TR:RETURN
13800 REM-SAVE DT%--
13810 RE=FA:C=0:LS=39
13820 O$="DDL"+H$:L=0
13830 O$=O$+CHR$(DT%(C)+0F):C=C+1:L=L+1
13840 IFC<NI*NVANDL<LSTHEN13830
13850 GOSUB600:IFLEFT$(I$,4)<>"DDLT"THENPRINTE2$:RETURN
13860 IFC<NI*NVTHEN13820
13870 RE=TR:RETURN
14000 REM-LOAD VARS-
14010 GOSUB14600:IFNOTRETHENRETURN
14030 NV=FND(1):NI=FND(2)
14040 FORI=0TONV-1:TY%(I)=FND(I+3):NEXT
14050 V=0:LS=40-NC
14060 L=0:GOSUB14600:IFNOTRETHENRETURN
14070 N=NC:GOSUB14800
14090 VA$(V)=A$:V=V+1:L=L+NC:IFL<LSANDV<NVTHEN14070
14100 IFV<NVTHEN14060
14190 RETURN
14200 REM-LOAD DISC-
14210 V=0:LS=40-VC:C=0
14212 IFTY%(V)<0THENV=V+1:GOTO14212
14214 IFV>=NVTHENRETURN
14220 L=0:GOSUB14600:IFNOTRETHENRETURN
14230 IFTY%(V)<0THEN14300
14240 N=VC:GOSUB14800
14250 DN$(V,C)=A$:L=L+VC:C=C+1
14260 IFL<LSANDC<TY%(V)THEN14240
14270 IFL>=LSANDC<TY%(V)THEN14220
14300 V=V+1:C=0:IFV>=NVTHENRETURN
14310 IFL<LSTHEN14230
14320 IFTY%(V)<0THEN14300
14330 GOTO14220
14400 REM-LOAD DT%-
14410 C=0:LS=39
14420 L=0:GOSUB14600:IFNOTRETHENRETURN
14430 DT%(C)=FND(L+1):C=C+1:L=L+1
14440 IFC<NI*NV AND L<LS THEN 14430
14450 IFC<NI*NVTHEN14420
14460 RETURN
14600 REM-GETLINE-
14610 RE=FA:H$=MID$(I$,5,4):O$="DDS"+H$:IFH$="0000"THENPRINT"NO DATA!":RETURN
14620 GOSUB600:IFLEFT$(I$,4)<>"DDST"THENPRINTE2$:RETURN
14630 RE=TR:RETURN
14800 REM GET A$ FROM I$
```

```
 14810 A$=MID$(I$,9+L,N)
 14820 IFMID$(A$,LEN(A$))=" "THENA$=LEFT$(A$,LEN(A$)-1):GOTO14820
 14830 RETURN
 15000 REM-PRESS RTRN--
 15010 PRINTR$;:LS=0:B$="":GOSUB8400
 15020 RETURN
READY.
```